The Role of Knowledge Artefact and Agency in IS Project Escalation

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Abstract

This research contributes to current academic thinking by highlighting new perspective to studying the IS Project Escalation phenomenon through the application of Agency Theory. This theory views the customer as the (principal) who needs an IS product, and the IS developer as the (agent) who creates this IS product. According to this viewpoint, examining current IS project escalation literature suggests the majority of previous studies implicitly adopted the assumption that the customer (principal) is entirely capable of identifying the requirements of the proposed IS product, and a project is prone to escalate because of the attitude of the IS developer (agent). This presents a gap in the literature in that the impact of the customer (principal) not been explicitly explored.

As such, one critical aim of this research is to investigate IS project escalation by employing an extension of Agency Theory. This extended theory assumes that the customer (principal) suffers challenges of incompetence when it comes to the transfer of knowledge (i.e. requirements) to the IS developer (agent). This leads to a situation of information asymmetry on the principal's side because of incomplete knowledge transfer. In turn, this situation develops and leads to IS project escalation. Another aim of this research is to investigate the process of requirement elicitation (RE) in IS development practice. This is to identify the role of the incorporated knowledge artefacts within this activity, in terms of how the project manager and developers effectively create and utilise these objects. Thus, this is in order to provide a possible solution with respect to the challenge of incomplete knowledge transfer.

To achieve that, this research employed a qualitative methodology and collected data in two stages in Saudi Arabia by using semi-structured interviews. In this respect, in the first stage, a number interviews with 30 IS project manager form five different IS development organisations is conducted. In the second stage, a number of interviews with 10 customers form different organisations is conducted.

The findings in general acknowledged and complemented a number of previous studies' results through the employed perspective of the extended Agency Theory in this research. Considering the identified gap, the empirical evidence supported the assumption of this research, and provided a new explanation for IS project escalation which highlighted the role of the customer (principal) this time. In addition, an influence diagram (i.e. Project Escalation Framework), which clarifies the relationship between the reasons behind incomplete knowledge transfer and IS project escalation, is developed. Also, the empirical evidence identifies a number of incorporated and relevant knowledge artefacts throughout the process of requirement elicitation (RE), namely Initial Request, Features, Process Diagrams, Prototypes, and Requirements. In this respect, the discussion categorised the different roles these artefacts can act out, in terms of being boundary object, epistemic objects, and activity objects. Additionally, a process diagram (i.e. Knowledge

Transfer Framework), which clarifies the knowledge process in five main steps during RE phase, is developed.

Analysing a number of IS development cases in a various contexts demonstrated multiple practical applications of the Project Escalation Framework with respect to managing issues building up to and leading to several project outcomes (i.e. success, failure, and escalation). Additionally, this analysis presented the artefacts in the Knowledge Transfer Framework as critical linchpins of an otherwise fragmented process when it comes to eliciting customer requirements. These artefacts have much broader implications that go beyond acting as just a procedure to elicit customer requirements. The 'inclusion' or 'omission' of these artefacts contributes to project success or failure respectively. Consequently, this understanding will result in improvement of IS development investigations, rather than exclusively enhance RE processes between principals and agents.

Furthermore, the findings provided a number of highlighted things to be aware of and useful hints which reflect professional experience from real life applications. Thus, considering learning from such rich experience in terms of employing the advantages and avoiding the drawbacks would positively reflect on IS development practice. This includes managing and dealing with challenges of IS development projects, particularly project escalation, in addition to improving RE process and enhancing the process of receiving customer requirements and ideas.

Table of Participated Conferences

The following publications, conference papers and posters are outputs based on research conducted throughout this PhD:

- Bukhary, W. and Kuk, G. (2013), Investigating Information System Project Escalation from the Viewpoint of the Extended Agency Theory. *Paper presented at: The 13th Annual Conference of the European Academy of Management (EURAM).* June 26-2, Istanbul, Turkey. [online] available from: <http://www.euramfullpaper.org/program/papers.asp > [5 JUN 2013]

- Bukhary, W. (2013), The Roles of Knowledge Artefacts In Transferring Customer Requirements in Information System Development Projects. *Paper presented at: The 13th PREBEM: The Conference for PhD Candidates in Business Economics and Management.* March 22, Amsterdam, Netherland.

- Bukhary, W. (2013), The Impact of the Incomplete Knowledge Transfer on Information System Project Escalation From the Agency Theory Viewpoint. *Paper presented at: The 13th PREBEM: The Conference for PhD Candidates in Business Economics and Management.* March 22, Amsterdam, Netherland.

- Bukhary, W. (2012), The Impact of the Customer on IS Project Escalation From the Viewpoint of Agency Theory: A Study of Saudi IS Project Managers. *Paper presented at: The 6th Saudi Scientific International Conference (SIC),* October 11-14, Brunel University, London, United Kingdom.

- Bukhary, W. (2012), The Impact of the Customer on IS Project Escalation From the Viewpoint of Agency Theory: A Study of Saudi IS Project Managers. *Poster presented at: The 6th Saudi Scientific International Conference (SIC),* October 11-14, Brunel University, London, United Kingdom.

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Wael A. Bukhary

Nottinghm, UK, February 2014.

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Chapter 1: Introduction

1.1 Introduction

This introductory chapter provides an overview of the research that is presented through the body of this thesis. This chapter starts by providing a background of the research taken. Then it presents research problem and highlight the gap in the literature. Next, it states the aims and objectives of the research. After that, the research process is described. Later, the chapter provides an overview of thesis structure.

1.2 Research Background

Governments and companies are investing more and more money in employing information system (IS) solutions. As more money is spent, the level of risk of these projects, in terms of potential failure, is growing. The monetary cost associated with the failure of IS projects has been estimated at "billions of dollars" annually. In addition, due to poor functionality, up to 15% of IS projects are discarded at the time of delivery (Charette, 2005). According to the Standish Group report (2011), only around 37% of IS projects were considered successful, with 11% being declared failures and the remaining 42% facing issues related to time, cost, and quality (Schwaber and Sutherland, 2012). What magnifies problems is that some of these projects continue consuming resources without achieving their targets. This means that such projects are permitted to continue with neither putting appropriate management in place nor rejecting the project, and this can lead to an escalation of associated problems. In other words, the real issue is that of Project Escalation, which is:

> "…a term often used to describe troubled projects that go wildly over budget and/or drag on long past their originally scheduled due date, but continue to absorb valuable resources" Zhang et al (2003, p. 115).

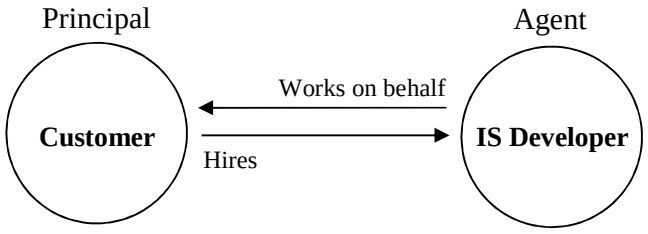
Moreover, Keil (1995) argued that this phenomenon is well documented within the management literature and is referred to in the field of software project management as IS Project Escalation.

Noteworthy, this research will consider the general signs of project escalation. These signs relate to unexpected and eventual increments project budgets, and unpredicted rises in delivery time. Thus, project escalation is seen as a usual faced challenge in the practice, instead of being an extreme situation of “Run a way” or totally “Out of Control” (Keil, 1995) over project management.

Furthermore, although numerous research studies have investigated the phenomenon of IS project escalation and how to minimize its negative impact, recent reports suggest that almost half of the IS projects carried out suffer various issues. This is in addition to the rate of project failure, which is quite alarming. This highlights how serious this problem is and the need for further investigation.

Therefore, this PhD research proposes to contribute to current academic thinking by highlighting new perspective on studying this phenomenon through the application of Agency Theory. This Theory is concerned with the relationship between a principal and an agent who works on behalf of the principal (Mahaney and Lederer, 2003). In this research, the customer is the principal who needs an IS solution (i.e. Computer Software) and the IS Developer is the agent who creates this IS solution (i.e. Computer Programmer). This can be visualised in Figure 1.1

Figure 1.1: Applying Agency Theory to the Parties Involved in an IS Project



Source: Developed by the author based on the study of Kiel et al (2000).

1.3 Research Problem

This being the case, it seems the literature on IS project escalation implicitly assumes that the principal is entirely capable of identifying goals, and that the agent perfectly understands what the principal requires. At the same time, the majority of previous research has primarily focused on one issue: the attitude of the agent or IS developer. For example, some studies employed a number of theories, like Approach Avoidance Theory, Self-Justification Theory, Agency Theory and Prospect Theory, to explain how the agent's actions may lead to project escalation (Keil et al, 2000; Zhang et al, 2003).

This research investigated the reasons for and the conditions behind the issue of project escalation in IS development projects by employing an extension of Agency Theory (Hendry, 2002). Thus, this research assumes that the principle suffers challenges in terms of incompetency when it comes to the transfer of knowledge (i.e. requirements) to the agent. This leads to a situation of information asymmetry on the principal's side. In this respect, one of the crucial challenges facing IS projects is the incomplete knowledge transfer regarding the customer's requirements during the Requirements Elicitation (RE) phase (Pawlowski and Robey, 2004; Chakraborty et al, 2010). So, this research focuses more on the impact of the customer's behaviour on project outcomes and operation.

Furthermore, according to the research's assumption, it seems crucial to deal with the issue of incomplete knowledge transfer in order to solve the issue of IS project escalation in the first place. In this regard, studying and learning from the successful applications of IS development itself sounds useful (Ewenstein and Whyte, 2009). One of the possible ways to achieve this is to explore the process of requirement elicitation (RE) and investigate the role of the incorporated artefacts within this activity. In this particularly, there are a number of employed artefacts and objects within the practice of IS development which assists bridging knowledge boundaries between the developers and the customer (Barrett and Oborn, 2010).

1.4 Research Aim and Objective

Considering the identified gap and research problem, accordingly this research mainly intends to do the following:

Firstly, this research aims to investigate the reasons and actors behind the challenges of (project escalation) and (incomplete knowledge transfer) in IS development practice, in addition to explores the relationship between these two challenges. That is to identify the impact of customer's behaviour in terms of project outcomes and operation.

Secondly, this research aims to investigate the process of requirement elicitation (RE) in IS development practice. This is to identify the role of the incorporated artefacts within this activity, in terms of how the project manager and developers effectively create and utilise these artefacts. Thus, this is in order to provide a possible solution with respect to the challenge of (incomplete knowledge transfer).

Accordingly, the following are research questions:

Question 1: *What evidence is there of conflict and contradiction by the customer, in terms of knowledge transferring to the IS developers? And what are its impacts in terms of project outcome and project operation?*

Question 2: *What form of knowledge transfer is evident between customers and developers, in terms of the practical techniques and tools provided by the project manager and developers?*

It is worth mentioning, identifying research gaps and suggesting possible solutions to deal with incomplete knowledge transfer are achieved through conducting an initial, broad critical literature review of IS project escalation, Agency Theory, and knowledge transfer in IS development practice. Moreover, this research is looking to achieve the following objectives. First, to propose a conceptual framework, which drawn by the extensive review of the related literature. In which, this conceptual framework considers the settings that present the research problem, and clarify the direction of the aimed investigations in this research. Second, to undertake the empirical research part

in the context of IS development in Saudi Arabia. Third, to conduct a number of analytic techniques, in which these techniques fit with research approach. Fourth, to develop revised and enhanced frameworks according to the empirical findings, in which these frameworks address the aims of this research.

1.5 Research Methodology

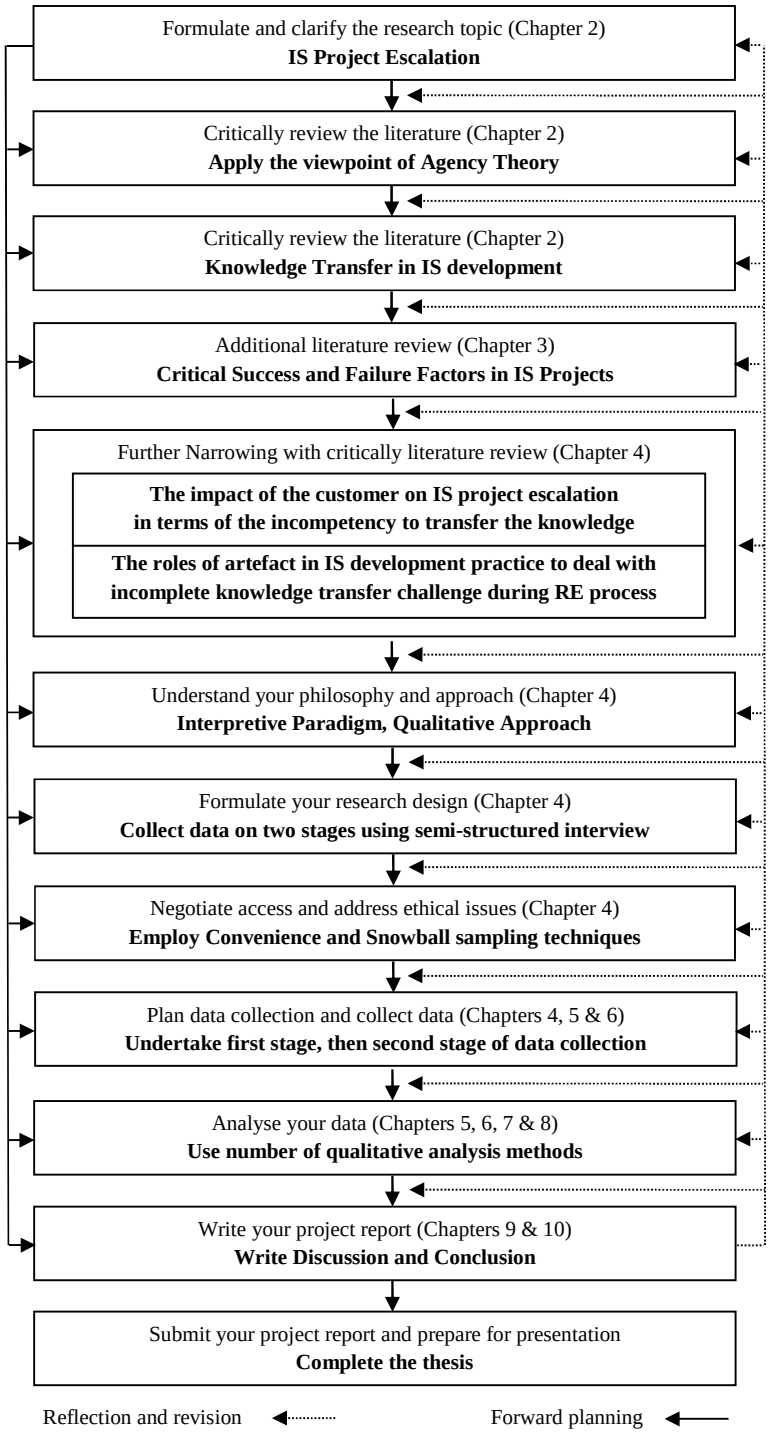
This research will rely on qualitative methods, and will collect data in Saudi Arabia in two stages. A number of semi-structured interviews with a number of IS project managers will be conducted in the first stage. In the second stage, a number of semi-structured interviews with a number of customers will be conducted. This setting will offer an opportunity to address the comments and feedback of both the principal and the agent, which in turn will strengthen the findings through applying data triangulation in the research.

Ethical considerations were taken into account in line with Nottingham University Business School Research Ethics Committee (NUBS REC)'s procedures and ethics bodies that regulate social field work. The anonymity all participants was maintained throughout all the stages of this research, data was kept confidential at all times, and in no way can participants be identified in this study.

1.6 Research Process

In order to meet the aims of this research, fill the identified gaps and answer the research questions, a critical research process has been created. Figure 1.2 shows the research process according to (Saunders et al, 2007).

Figure 1.2: PhD Research Process



Source: Developed and modified by the author based on (Saunders et al, 2007, p. 10)

1.7 Research Structure

Chapter 1 provides an introduction to the research. It starts with the brief background of IS project escalation and Agency Theory related literature. After that, it is followed by a short discussion with respect to the research problem, aims, questions, objectives, and methodology. Then it creates a research process. Finally, the research structure is provided.

Chapter 2 provides a review of the literature of IS project escalation literature. Then it introduces the concept of Agency Theory, and how to utilise it in this research to present its viewpoint. This will be followed by a critical discussion in order to identify the gap among previous studies, and to determine the research assumptions in terms of targeted challenge of incomplete knowledge transfer between the IS project's involved parties. Later, the chapter focuses on knowledge transfer in IS development related literature, and aims to outline a strategy to deal with the challenge of incomplete knowledge transfer.

Chapter 3 focuses on critical success and failure factors in IS projects. That is to provide a background with respect to these factors in order to support and assists the analysis process.

Chapter 4 describes the research design and methodology. It starts by developing the conceptual framework of the research. Then, it discusses the appropriate philosophy and paradigm of this research. Next, it clarifies research design in terms of the proposed data collection plan and tools. Later, it identifies the suggested analysis strategy.

Chapter 5 sets the focus of the empirical research stage. It presents the data analysis and resulting outcomes with respect to the viewpoint of IS project managers in the first stage of data collection. The analysis in this chapter addresses the first aim of this research.

Chapter 6 considers the viewpoints of the customers in the second stage of data collect. Additionally, the analysis in this chapter addresses the first aim of this research.

Chapter 7 analyses the related data to knowledge transfer from both stages of data collection. That is in order to identify the incorporated artefacts within the process of requirement elicitation. Thus, analysis in this chapter addresses the second aim of this research.

Chapter 8 uses some of the analysis outcomes in the previous chapters to investigate a number of IS development cases and situations. That is in order to identify the main reasons and actors behind each outcome of a project and RE process.

Chapter 9 presents an overview of the core findings of the analysis. It discusses the findings and then relates them to the reviewed literature on the light of the employed theories and stated aims.

Chapter 10 provides a number of recommendations to support the field of IS development in response to the recent reported rate of troubled projects, particularly the escalated ones which often result due to an inaccurate understanding of customers' requirements. So, it highlights the practical and theoretical implications of the research, and how this research will add to current knowledge. The chapter then concludes with a discussion on research limitations and makes recommendations for future research.

Chapter 2: Literature Review

2.1 Introduction

The last chapter provided an introduction to the research, and an outline of its aims and research structure. This chapter reviews a wide range of literature which draws upon numerous related bodies of knowledge.

This chapter begins by reading through IS project escalation related literature. The concept of Agency Theory introduction comes next, this to use the viewpoint of this theory to examine and identify the gap within the IS project escalation previous studies. Then, the chapter focuses on the process of requirement elicitation (RE) between customers and developers in IS development projects. Thus, it reviews number of knowledge transfer concepts.

2.2 IS Project Escalation

2.2.1 Defining IS Project Escalation

Zhang et al (2003) define "project escalation" or "runaway projects" as "terms often used to describe troubled projects that go wildly over budget and/or drag on long past their originally scheduled due date, but continue to absorb valuable resources" (p. 115).

Project escalation also leads to on-going commitment to the project with fear of negative comments and uncertainty over outcomes. Moreover, Brockner (1992) refers to an as "… the tendency for decision makers to persist with failing courses of action" (p. 39).

2.2.2 History of IS Project Escalation

Keil (1995) argues that IS project escalation, as a phenomenon, has been well documented within management literature and field of software project management. Since troubled IS projects were permitted to continue, with neither a halt being called nor appropriate management action taken, poor

project management was blamed for the negative results. Furthermore, escalation is considered a common phenomenon within IS development practices (Abdel-Hamid, 1988). There are numerous of reasons behind the challenge of IS project escalation. One of these reasons could be the intangible nature of such computer software product, in addition to absence of sensible project milestone. This results to incorrect progress reporting, and leads to fake feeling of project's closeness completion or "completion effect" as described by Conlon and Garland (1993).

Another reason is re-setting project scope. This happens in response to changing clients' requirements during the operation of the project. In terms of software development, this may result in the cancelation of up to 50% of the completed project structure. Therefore, in fact, IS development is considered a complex task due to the associated uncertainty of work processes jointly with the need to introduce additional business knowledge from various stakeholders Keil (1995). Thus, it will lead to further vagueness in deciding whether to abandon or continue a troubled project.

Within the early literature of IS project escalation, Staw and Ross (1987) suggested that it is possible to explain such a complex phenomenon through four types of influential determinants. They are as follows:

(1) Project Factors

These factors depend on the nature of the project itself and how the management team views its objectives, such as budget, expected duration and difficulty. Projects tend to escalate in cases where there is a possible huge payoff, in cases where there is a considerable target which involves long-term investment, or in cases when challenges are considered as recoverable issues.

(2) Psychological Factors

These factors are concerned with project managers' perceptions of and reactions to project issues. Furthermore, psychological factors relate to earlier experiences with similar projects, and the sense of responsibility felt for the outcome. Thus, these factors impact on the perception of information. This area has particular impact when the project manager, with an earlier successful history, tries to maintain and turn around a failing project by consuming more resources, rather than terminating the project or admitting to a poor decision earlier in the process.

(3) Social Factors

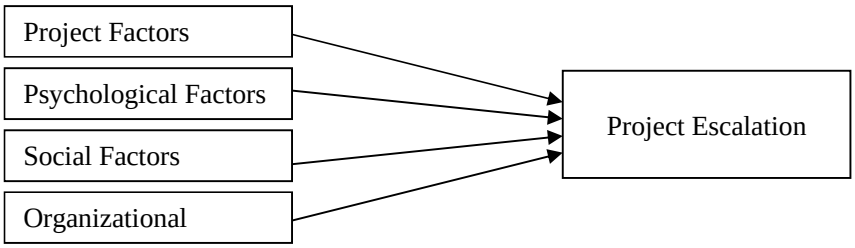
Social factors are concerned with the existence of competitive rivalry between project parties or groups (i.e. between the decision-making group and another social group). In addition, social factors highlight the need for external justification and consistency of standards. For example, escalation is influenced when "external stakeholders have been led to believe that the project is (or will be) successful, and when norms of behaviour favour 'staying the course'" (Keil, 1995, p.423).

(4) Organisational Factors

These factors are affected by the extent to which the project reflects an organisation's politics and goals. In cases where higher management has political support, or where the project is part of a constitution, escalation of the project becomes more likely.

In order to provide better understanding and to investigate the possibility of observing such a phenomenon in actual IS practice, Keil (1995) developed a research model in Figure 2.1 based on the project escalation factors of Staw and Ross (1987).

Figure 2.1: Model of Project Escalation



Source: Adopted from Keil (1995, p. 422)

Based on this model, an in-depth single case study of an IS project called "CONFIG" was reviewed. This project started in the 1980s, faced numerous issues, and kept consuming millions of dollars until it was halted in 1992. The data was collected in three different ways: interviewing, observations, and through reviewing records. The findings suggest that this project demonstrated several factors including the ones adopted in the model, in addition to influence of the managerial implications. It appears that project escalation, in this case study, occurred due to inaccurate decision-making during operation. The study also presented the outcomes of the project as having a negative impact on the organisation.

Later investigations, however, have tried to find other reasons for project escalation by employing various theories and assumptions which may provide a better understanding (i.e. Keil and Flatto, 1999; Keil et al, 2000; Zhang, 2003). The following section will review and discuss some of these theories.

2.2.3 Theories to Explain IS Project Escalation Behaviour

Numerous studies and theories have been proposed in attempt to explain the types of behaviour surrounding project escalation. For example, Approach Avoidance Theory, Prospect Theory, Self-justification Theory, and Agency Theory. The following will focus on each of these theories.

2.2.3.1 Self-Justification Theory (SJT)

Since initially proposed, Self-Justification Theory (Staw, 1976) has been well used in widespread escalation literature. Staw's role play experiment demonstrated that additional resources tend to be used when a person feels a sense of personal responsibility for a previously failed course of action. According to SJT, people are willing to escalate their actions in order to justify earlier actions, even though outcomes may be worse. People will ignore negative evidence and commit more resources because they feel responsible. In other words, SJT suggests that escalation occurs particularly in cases where existing commitment equals negative information (Keil and Flatto, 1999). Actually, within the concept of SJT, activity escalation seems to be impacted by "retrospective rationality" concept, where a prior action is defended to prove its competence by the decision maker (Whyte, 1986).

Whilst SJT is considered the first and most popular theory to explain escalation phenomenon, it has been criticized in some escalation studies. For instance, Brockner (1992) argued that a limitation of SJT is that it provides an incomplete explanation for such a phenomenon. Thus, other theories have been developed to aid understanding of escalation.

2.2.3.2 Prospect Theory (PT)

From the literature of human decision-making, prospect theory was proposed to contribute a better understanding of the behaviours associated with escalation. According to Whyte (1986), PT is concerned more with the motivation to make a decision, particularly in risky and uncertain situations. Furthermore, PT assumes a level of risk aversion by staff, who assess and respond to risk based on how the situation is perceived. As such, this theory shows that in cases of risk-seeking, individuals react by choosing between (certain loss), or (possible bigger loss) with probability of coming back to reference point. Therefore, it is possible that escalation may occur as result of the choices of decision makers. Moreover, this theory helps to justify the effect of 'sunk cost', or "throwing good money after bad", because it encourages the

perception of a balance of risks in terms of escalating commitment (Whyte, 1986).

Prospect theory is different to SJT in terms of personal responsibility in developing commitment. On one hand, SJT indicates that escalation is supposed to take place where a level of culpability exists on the part of the decision maker for an earlier failure. On the other hand, prospect theory implies that moving towards escalation should be based on a choice between two losses, and personal responsibility is not the primary factor for framing this choice, though it could be contributory one.

2.2.3.3 Agency Theory (AT)

This theory provides another perspective on the escalation phenomenon. Initially, AT was used in corporate governance. It concerns itself with the issues between a principal and an agent who works on the behalf of the principal. According to AT, problems occur when an agent acts for his own benefit rather than for the benefit of the principal. In other words, it is the agent's opportunistic and self-interested behaviour which leads to problems (Mahaney and Lederer, 2003). Regarding the escalation issue, if the agent keeps some information related to project progress and expected performance secret, and the principal is unable to observe agent's activities, then information asymmetry arises. In this situation, a decision by the principal to halt the project would damage the agent's reputation. Therefore, the agent tends to maximize self-profit at the expense of the principal's profit (Kiel et al, 2000). There will be more discussion about Agency Theory in section 2.3.

2.2.3.4 Approach Avoidance Theory (AAT)

In any difficult situation, because of opposing forces, there is a dilemma; whether to pursue or withdraw. Within the context of AAT, escalation of activity is recognized as a result behaviour between promoting

forces which encourage continuance, versus restraining forces which support abandonment (Brockner and Rubin, 1985).

Such driving forces may outweigh abandonment forces for many reasons, for example, the withdrawal cost, the value of goal achievement, and the closeness to the goal itself. Therefore, it seems related to what is called the "completion effect", which is the wish to accomplish any mission that has begun. This effect has a notable effect on attitude, because it correlates with future gains (Mann, 1996). Furthermore, such an effect may lead to escalation in commitment in terms of goal replacement and at the same time, may influence the suck cost effect (Conlon and Garland, 1993).

This completion effect is more likely to occur on software development projects, because such projects have a syndrome of "90% complete". This refers to gradually increasing work progress up to 90%, which is sometimes reached in half of the project duration. After that the achievement rate is estimated to be fraction and slow (Abdel-Hamid, 1988). Thus, it leads to a false feeling that completion is near.

Among all these theories, while the aim was to clarify escalation attitude, one of the purposes of the study of Kiel et al (2000) was to investigate whether different models based on constructs deriving from these theories, as clarified in Table 2.1, can differentiate an escalated project from a non-escalated project.

Table 2.1: Theories and Constructs Used in IS Project Escalation Literature

Model based on	Constructs
Self-Justification Theory	Psychological Self-Justification, Social Self-Justification
Prospect Theory	Sunk Cost Effect
Agency Theory	Goal Congruency, Information Asymmetry
Approach Avoidance Theory	Completion Effect

Source: Developed by the author based on the study of Kiel et al (2000)

In Kiel et al's (2000) study, two forms of research survey were developed. One of the forms aims to collect data from escalated IS projects, and the other aims to collect data from the non-escalated ones. The participation rates were 70% and 30% respectively. The reason for this grouping is to provide a reference point in order to allow comparison later, while taking into account the significant differences in the research base of escalated and non-escalated IS projects. Assuming that IS auditors would be more objective in monitoring IS projects, the IS auditors from the Information Systems Audit and Control Association (ISACA) in the U.S. were chosen to be the sample in this study.

The analysis focused on 579 returned surveys out of the 2231 distributed. Based on the findings, all models notably managed to evidence the probability of project escalation. Furthermore, many of the constructs presented some positive attitudes in classifying between escalated and non-escalated projects. According to the findings, the model, which is based on approach avoidance theory, achieved the highest result by correctly categorising 70% of both types of projects. The model, based on Agency Theory, also performed significantly in categorising escalated and non-escalated IS projects. On the other hand, the models based on self-justification theory and prospect theory performed well in categorising escalated projects but poorly in categorising non-escalated IS projects.

2.2.3.5 Project Management (PM)

While the constructs derived from previously mentioned theories showed signs of reasonable categorisation of the escalated and non-escalated IS projects, there was no examination of constructs related to project management literature. Thus, Keil et al (2003) designed a model using constructs derived from the project management literature. These constructs and their relationships to project escalation is as follows:

(1) Project Planning

Improper planning may negatively impact on the common understanding and scope of a project. Thus, without clear checkpoints or deadlines, it is hard to manage tasks or distinguish between right and wrong actions.

(2) Project Specification

Poor specification tends to lead to a need for frequent modification and scope changes. As a result, this often leads to a revision of completed activity and instruction. This in turn affects operational costs, scheduling, and project potential. In addition, the sense of achieving within the designated timescale will be affected with each change.

(3) Project Estimation

Project estimation covers one of the central issues in IS projects, which is estimating required resources such as time, money, and staff. Underestimation will lead to significant deviation from original plans, and difficulty in distinguishing between normal deviations and the crucial ones.

(4) Project Monitoring and Control

The main goal of monitoring and controlling actions is to manage the project well and continually bring it back on track. Poor controlling and monitoring methods results in an inability of management to take corrective action in response to any issues that arise. Furthermore, a troubled project may be allowed to continue to consume resources while it might otherwise be terminated or significantly redirected. So without performance and progress monitoring, schedule and budget overrun may go unnoticed.

The analysis used data which was collected as part of Keil et al's (2000) study. The findings suggest that project management constructs provide

significant capability when it comes to categorising escalated and non-escalated IS projects. In fact, this model offers better functionality than previously mentioned models which are based on escalation literature. One of the possible reasons for the significance this model achieved is the rich evidence that project management context provides. Moreover, the constructs of project management are clear and easily accessible. Thus, they are understandable and related to managers' objectives.

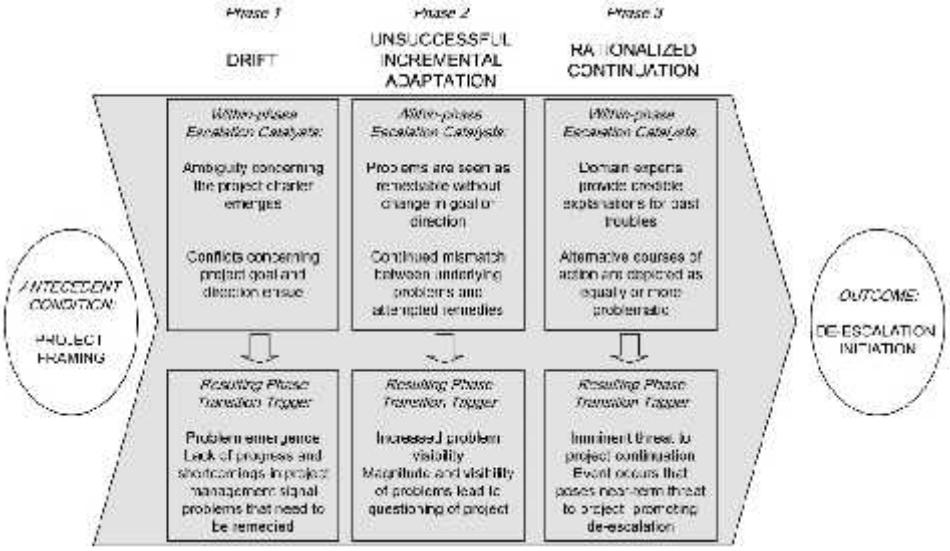
2.2.3.6 The Process of IS Project Escalation

While numerous studies have investigated the reasons behind project escalation, identified which factors directly impact on project outcomes, and provided models based on independent constructs, only few have focused on escalation process (i.e. Staw and Ross, 1987).

Thus, Mahring and Keil (2008) aimed to develop a process model which described and recognised the procedure and steps leading to a certain project outcome. At the same time, this process model should be able to clarify, based on a specific logic, what triggers a course of action between stages. Mahring and Keil used a single, in-depth case study of a troubled banking system called (NDS). The data was collected using qualitative methods (interviewing staff), observing implemented IS solutions, and studying corporate records (i.e. documents, videos, reports).

The target process model describes three main phases that IS project escalation may go through: drift, unsuccessful incremental adaptation and Rationalised continuation. There are also some within-phasing and triggering situations which can encourage development from one phase to the next, they are: project framing, problem emergence, increased problem visibility, and imminent threat to project continuation. At the end of the process, a de-escalation initiation outcome will be triggered. The following will explain each of these phases and triggers as presented in Figure 2.2.

Figure 2.2: The Escalation Process Model of IS Project Escalation



Source: Adopted from Mahring and Keil (2008, p. 255)

(1) Project Framing (Antecedent Condition)

This triggering situation, prior to the launch of the project, covers the primary business argument and the emerging view to the organisation. Much of the existing literature highlights the relationship between framing and escalation in terms of decision making (e.g. Whyte, 1986). Therefore, framing has a significant impact on operations in terms of how the project is perceived and how this shapes subsequent actions.

(2) Drift

This is the first phase in the model and previous literature asserts that 'drift' happens in the early stages of escalated projects (Sauer, 1993 and Drummond, 1996). Two uncertain elements influence drift: project charter ambiguity, which refers to the lack of a clear outcome definition and what should be accomplished, and project goal and direction conflict, which concerns the impact of vagueness and deviation in a project's perception and future.

(3) Problem emergence

According to this, problems keep appearing as long as drift continues. This in turn affects the relationship between the project and its controller in terms of reactions and decisions, available knowledge, and the readiness of any contingency plan. Thus, the project manager will have an additional responsibility to deal with and will have to solve emerging problems.

(4) Unsuccessful Incremental Adaptation

Commonly, where problems are identified, management responds in limited ways and without significant modification of the original plan. Persistently avoiding solving or dealing with issues in this way leads to escalation. However, the issue of incremental adaptation is natural in IS projects, and is only considered problematic when the nature of the problem does not allow for suitable adaptation.

(5) Increased problem visibility

As a result for pursuing unsuccessful incremental adaptation, the problem may increase in terms of importance and complexity, and becomes more unsolvable. In this case, a decision should be made regarding the continuation of the project.

(6) Rationalised Continuation

In this phase, even though the problem is acknowledged, the continuation of existing attitudes justifies and marginalises this acknowledgement. Thus, any new procedures set in place to address any issues will be ignored and instead, there will be a reliance on previous responses. In the previous phase, the response was based on the assessment of the problem as manageable. Later, although the inadequacy of that assessment may be evident, excuses for failure of earlier actions may be made and any alternative course of action will be presented as equally or more problematic.

(7) Imminent threat to project continuation

The persistence of the rationalised continuation phase is likely to jeopardise the project, and put it in a position of imminent threat. However, some literature (Ross and Staw, 1993 and Keil, 1995) suggests that such a hazard, either from inside or outside the company, will trigger the tendency to resist escalation.

(8) Outcome: De-escalation

This is the last outcome of the entire escalation process, where it is clear that the earlier decisions and reactions lost their credibility. At this point, the project should be either abandoned or redirected.

In summary, the findings suggest that escalation may occur as a result of the continual ineffective handling of difficulties that present themselves while the project is running. In fact, frequent mismatching of solutions and problems will lead to increased escalation. Furthermore, the signs of escalation can be seen in the early stages when a project is framed, which focuses on the motivation for the project and how it is viewed. This study introduces an additional factor into the complex process of escalation: specifically, how a running project can be developed in an inappropriate way.

2.2.4 Section Conclusion

All in all, based on the IS project escalation literature review, it appears that project escalation is a general phenomenon which may occur in any type of project. Escalation is more likely to occur in an IS project. At the same time, IS project is considered a complex task with uncertain processes related to the product's intangible nature as computer software, together with the need to introduce additional business knowledge from various stakeholders. Indeed, it is a problem which induces significant cost to both organisations and governments. Numerous previous studies contributed to investigate this phenomenon. In this respect, some of these studies identified a number of factors which have direct impact on project's results. Other studies created

models using constructs derived from a number of psychological theories to distinguish the signs of escalated projects. A later study designed a model to describe how escalation process develops.

This research aims to contribute to current academic thinking by highlighting new perspectives to studying the phenomenon of IS project escalation through the application of Agency Theory in order to identify possible gaps in the literature. The next section will shed light on this topic.

2.3 Agency Theory

2.3.1 General View

Agency Theory concerns itself with the issues between a principal who hires an agent to working on the behalf of the principal. It is possible to outline this theory as follows: in a perfect situation, where all parties are rational, the principal assigns authority to the agent who works on the behalf of the principal, then, the principal simply pays for the agent's output. Usually, there should be no problem where the agent is honest and works perfectly within the principal's interest (Mahaney and Lederer, 2003).

One of the common applications of Agency Theory is known as the principal's problem (Ross, 1973). It is possible to expand this point as follows: in a perfect situation, where all parties are rational, the principal assigns authority to the agent who works on the behalf of the principal, then, the principal simply pays for the agent's output. Yet, due to uncertainty in the situation and the impact of external pressures on the output, both parties usually sign an incomplete contract, in which the agent will be paid based on his efforts. There will be no problem where the agent is honest and works perfectly within the principal's interest. However, Agency Theory assumes the agent is not perfectly honest. Thus, the agent is assumed to be opportunistic and self-interested, with different goals to the principal, and an absence of effective control as a result of incomplete knowledge (Hendry, 2002; Keil, 2005). Moreover, according to Sharma (1997), due to the huge extent of specialisation in professions, out-source service organisations have been

considerably raised by the modern economy. Such organisations use skilled workers to provide various services on a contract basis. Thus, the principal will hire an agent, who is a professional in the field, to achieve the principal's objectives. Due to the high level of professionalism that the agent has, it is difficult for the principal to track or monitor the agent's behaviour. At the same time, if the agent does not have the ability to transfer his understanding to the principal, this will fuel a situation of information asymmetry. Hence, the problem occurs when an agent takes advantage of this situation, and acts for his own benefit rather than for the benefit of the principal (Sharma, 1997; Kiel et al, 2000).

Furthermore, considering the challenges in such a relationship, (Keil, 2005) pointed out that within the last decade the demand for out-sourcing in the field of IS has increased dramatically. Like any out-source service, they share the same economic relationship between the principal and the agent. The following will focus on three main types of problems, in terms of coordination and motivation, in this relationship.

(1) Adverse Selection

This is concerned with the risk that an agent may make a dishonest claim about delivery of the outcomes, based on misrepresentation of the agent's capabilities. In this situation, the principal cannot accurately judge the agent's quality or intentions, thus the principal may pay more than the agent's actual value on the market.

(2) Moral Hazard

This is concerned with the risk that the agent's effort will be inadequate compared to that agreed to achieve the principal's goal. This problem arises when the principal cannot observe or control the agent's attitude, due to the inability to interpret the reported information. In other words, it is the effect of information asymmetry.

(3) Hold-up

> This is concerned with the risk that the agent exploits the other party's dependence. For instance, even if the principal was aware of the opportunistic behaviour of the agent, in some cases it is less expensive for the principal to keep the current agent rather than signing a new contract. The impact of this problem is evident when there is a conflict of interests and goals between them.

In response to the issues in the relationship between the principal and the agent, and in order to encourage the agent's focus, the principal can monitor the agent's actions. In addition, the principal can also pay the agent based on outcomes (incentive pay). However, these solutions seem most likely to increase cost for the principal (Hendry, 2002).

2.3.2 Extended Agency Theory (Principal's Other Problems)

The standard assumption of Agency Theory is that project objectives are identified by an entirely competent principal, and the entirely competent opportunistic agent is looking to achieve his own goals. Thus, using monitoring or incentive payment will encourage the agent to be honest and entirely competent when it comes to delivering the principal's objectives. The application and study of Agency Theory has been dominated by this assumption of agent opportunistic and self-interested behaviour. However, according to Hendry (2002), this assumption has been frequently disputed by writers on management for two reasons. Firstly, applying the formal Agency Theory to predict the attitude of members in a team, based on compensation and profit sharing scheme, has failed. Secondly, since managers depend on both their own misleading feelings and others' inaccurate opinions, working in the management field is not easy. In fact, judgment and discretion are crucial parts of managerial activities. So, it seems that it is common sense to employ professional management and train them, particularly in the area of discretion. In response to this critique, two questions have arisen:

> "To what extent are Agency Theory's predictions dependent on its particular behavioural assumptions and to what extent on more general properties of agency relationships? Can they be generalised or extended so as to allow for different behavioural assumptions, more naturally appropriate to the management context?" (Hendry, 2002, p. 98)

Therefore, in order to extend Agency Theory, Hendry (2002) ignored the previous assumption and instead proposed that "…both principals and agents are honest and enter into obligations to achieve, as best they can, their principals' objectives" (p. 101). In this situation, problems may occur when the principal's goal is difficult or too complex to be captured. In addition, the principal may not be capable of communicating the information to the agent. Thus, these problems are linked with the less ability of people to specify their concerns. Thus, it presents issue of "specification and incompetence" on part of the principal.

Based on the results, Hendry (2002) provided and considered some propositions that differed from the existing theory. For example, the standard theory provides some predictions for the impact of monitoring an agent's attitude. However, since this monitoring function does not include any guidance, it has no affect in the context of the new theory. Another significant difference is in the case of information asymmetries. On the one hand, the standard theory suggests that abstracted tracking will promote agent opportunism, and encourage the principal to use outcome-based payment. On the other hand, the new theory suggests that in such a situation, the principal will rely more on the loyal agent's efforts, and keep away from outcome-based payment, because the agent works for the principal's benefit all the time. In addition, the theory concludes that this analysis does not contradict the standard theory. Rather, it is an extension which presents other features of principal and agent relationships. "More important, it opens the way for applications of Agency Theory to more complex management situations in which opportunism is not the central issue" (p.98).

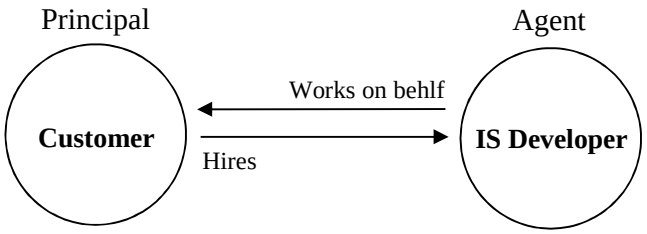
In summary, according to this extended Agency Theory, there is a problem on the principal side, which is the inability to transfer knowledge or

understanding. In other words, due to goal complexity, the principal may be incompetent in terms of adequately explaining what he wants or sharing knowledge effectively with the agent.

2.3.3 IS Project Escalation from the Viewpoint of Agency Theory

According to the viewpoint of Agency Theory, the customer is the (Principal) who needs an IS product (i.e. Computer Software) and the IS Developer is the (Agent) who creates this IS product (i.e. Computer Programmer). Figure 2.3 clarifies this point.

Figure 2.3: Applying Agency Theory to the Parties Involved in an IS Project



Source: Developed by the author based on the study of Kiel et al (2000)

This being the case, the majority of previous research has primarily focused on one issue: the attitude of the agent or IS developer. To expand this point, a number of theories (for example, Approach Avoidance Theory, Self-Justification Theory, Agency Theory and Prospect Theory) were used to explain how the agent's actions may lead to project escalation (Keil et al, 2000; Zhang et al, 2003). Moreover, in the study by Keil et al (2003), a number of constructs, deriving from project management literature, were used to distinguish the characteristics of an escalated project. In this respect, the fact is that these constructs belonged to the agent's side, in terms these constructs are in a place of IS project manager's concern. Furthermore, in another study which outlined a process model to describe escalation behaviour (Mahring and Keil, 2008), the role of the principal or customer was absent. Additionally, the

majority of the process was running at the agent side. Similarly, when considering the impact of information asymmetry in such a relationship. As a consequence, the literature suggests escalation occurs due to the agent's attitude and the way in which they take advantage of information asymmetry (Keil et al, 2000).

2.3.4 Research Problem

The issue of information asymmetry is a key concept in the application of Agency Theory and its extension. It seems there are different scenarios in terms of the structure of the relationship between the principal and the agent. These scenarios differ in terms of who the competent party is and how they can successfully transfer knowledge to the other party. Table 2.2 shows these scenarios.

Table 2.2: The Possible Situations for the Relationship between the Principal and the Agent In Terms Of Knowledge Transfer Competency

		Agent	
		knowledge Transfer Competent	**knowledge Transfer Incompetent**
Principal	**knowledge Transfer Competent**	Scenario (B)	Scenario (A)
	knowledge Transfer Incompetent	Scenario (C)	

Source: Developed by the author

The following describes each of the scenarios:

- Scenario (A): Competent principal and incompetent agent

  Sharma (1997) provided a frame work for this scenario, where professional agent may "control relevant task-related knowledge" which in turn gives the power to the agent over the principal, thus,

information asymmetry arises as result. Keil et al (2000) investigated this scenario using constructs derived from standard Agency Theory.

- Scenario (B): Competent principal and competent agent.

  Such a situation (where information asymmetry is not the main concern unlike in the case of Agency Theory) has been previously investigated using number of theories, such as Self-justification theory, Prospect theory, and Approach Avoidance theory (i.e. Kiel et al, 2000).

- Scenario (C): Incompetent principal and competent agent

  Hendry (2002) provided a framework for this situation in which the issue of information asymmetry arises. To the best of the author's knowledge, this scenario has not yet been employed in the field of IS project escalation, which presents a gap in the literature.

This research is not concerned with the last possible scenario, in which incompetent principal meets incompetent agent, as this area is simply beyond the scope of this research.

The majority of previous studies have implicitly adopted the assumption that the principal is entirely capable of identifying goals, and that the agent perfectly understands the principal's requirements. It is widely suggested that in this situation escalation occurs as specified in Scenarios (A) and (B).

Thus, referring to the described gap in Scenario (C), this research employs the provided framework by the extended Agency Theory (Hendry, 2002), and investigates the reasons for and conditions behind the issue of project escalation in IS development. Consequently, this research assumes that the principle suffers challenges of incompetence when it comes to transferring knowledge to the agent. This leads to information asymmetry.

In exploring, how information asymmetry can affect the operation and outcomes of a project, Mahring and Keil's (2008) process model of IS project escalation is useful. Findings from their research suggest that signs of escalation can be seen at the early stages of a project, for example, when it is initially framed. Escalation may be the result of the continual ineffective handling of difficulties that present themselves when the project is running. Therefore, it may be that the problem started at the beginning, when the principal was unable to successfully transfer knowledge. This means, this research focuses more on the impact of customers' behaviour on project operations and outcomes.

Furthermore, this research suggests that in order to deal with escalation in IS projects, it is crucial to deal with the issue of knowledge transfer incompetency in the first place. The next section will focus on the processes and challenges concerned with the transfer of knowledge between customers and developers in IS development projects

2.4 Knowledge Transfer in IS Development Projects

2.4.1 General view

Investigating the process of transferring customers' knowledge to IS developers, or what is known as requirement elicitation (RE), represents an interesting subject in IS studies. The aim of this process is to precisely identify the needed customer's requirements. Another aim for RE process is to discuss and approve these identified requirements before starting the development stage (McConnell, 1996). During this process, the customer sits on one side and is viewed as the knowledge source: informing about details such as business roles, the desired screen layout, required functions, and other features that make up the entire project. The developer sits on the other side and acts as a system analyser in terms of receiving information and understanding the requirements. The developer then begins to create the proposed IS product according to the customer's needs (Leffingwell and Widrig, 2000; Davis et al, 2006).

Investigating the process of knowledge transfer in the field of IS helps to determine the difficulties and the opportunities that could be faced in such practice. As result, this investigating assists to enhance this process, in terms of focusing on the identified strengths and dealing with the discovered weaknesses (Chakraborty et al, 2010; Urquhart, 1997; Mathiassen et al, 2007). Particularly, the issue of incomplete knowledge transfer is considered as one of the crucial factors in IS development project failure (Pawlowski and Robey, 2004). In this respect, Lindquist (2005) showed that up to 71% (the highest rate of all factors) of IS development failure is the result of poor requirement analysis. Furthermore, Davis et al (2006) stated that the challenge of unclear requirements represents a significant failure factor 90% in large IS development projects. Moreover, the expense of such a challenge was estimated at $100 Billion in the USA in 2000. Expenditure does not only include project failure but also the cost of rectifying errors. This alone is estimated to represent up to 75% of the total cost of project failure (Davey and Cope, 2008).

In addition, the literature identifies a number of factors for improving the system analysis process. According to Chakraborty et al (2010) these can include, for example, using various communication techniques (Ocker et al, 1998), or engaging the customer through participatory design approaches (Lynch and Gregor, 2004). Also, a number of methods and techniques have been suggested to influence RE activity, such as employing different modelling and conceptualizing procedures (Wand and Weber, 2002), conducting novel interviewing (Browne and Rogich, 2001), and using Joint Application Design (JAD) sessions (Liou and Chen, 1993).

Table 2.3 shows 12 techniques to elicit the requirements as Davey and Cope (2008) identified them based on the framework of acquisition of requirements (ACRE) of Maiden and Rugg (1996).

Table 2.3: The 12 Acquisition of Requirements Techniques

ACRE techniques	
Observation	Unstructured interviews
Structured interviews	Protocol analysis
Card Sorting	Laddering
Brainstorming	Rapid prototyping
Scenario analysis	RAD workshops
Ethnographic methods	Repertory grids

Source: Adopted from (Davey and Cope, 2008, p. 544)

Although there have been numerous contributions to this field, scholars still note limitations. Davey and Cope (2008), for example, argue that the majority of information system theories assume that requirements are always stable. This ignores the dynamic and changing nature of many organisations. Thus, this negatively reflects on the feasibility of communication processes between parties involved. More, Chakraborty et al (2010) point out that over the last fifteen years, there has been a significant change in the practice of requirement development. Moreover, the suggested RE techniques extracted from a number of studies seem hard to manage. Furthermore, Mathiassen et al (2007) discussed the challenge of establishing interactive communication between developers and customers due to the shortness of project life-cycles. This is in addition to the risk of a general communication gap between customers and developers, and the issue of using “unfamiliar language that is domain specific” during the interactions. Consequently, it should be considered important to focus more on interactions within the process of RE and how information relating to customer requirements is transferred to developers (Urquhart, 1997 and Mathiassen et al, 2007).

In this respect, the issue of knowledge transfer has a significant impact on activity as it guides learning (Jabar, 2012). The following section will focus more on knowledge transfer body of literature.

2.4.2 Knowledge Transfer

Kumar and Ganesh (2009) defined knowledge transfer as an exchanging activity, in which a party provides knowledge (i.e. tacit or explicit) in order to be received and used by another party. This party could be a person, group of people, or organisation. Moreover, when it comes to investigating in knowledge transfer, Joshi et al (2007) highlighted the importance of identifying the suitable epistemological views which serves the perspective of the research.

There are three common types of epistemological views: Cognitivistic, Connectionistic, and Autopoietic. The first perspective (Cognitivistic) considers knowledge as a fixed entity, like data stored in computers and manuals, so knowledge itself has no role in the transferring process. However it seems to be sharable without any problems between the entities, and without any significant impact by other factors like process rules or prior knowledge. Under the second perspective (Connectionistic), knowledge does not seem to have common characteristics. Rather, it is considered as contextual. Moreover, within this perspective, transferring knowledge seems to be challenging because of the number of factors, for instance the context of the knowledge, the need for common understanding between knowledge source and receiver, and connectional social-interaction related issues (i.e. ties or network). The third perspective (Autopoietic) originates from the concept of self-production. Knowledge here is considered to be generated in an autonomous manner without abstract characterisation. As a result, this perspective assumes that knowledge is something to be created rather than something to share, like a dependent history. Venzin et al (1998) pointed out that no view is more preferable than the rest and that it is a matter of picking the one best suited to a situation or area. On this basis, Joshi et al (2007) presented ‘Connectionistic’ as the most appropriate perspective for IS development research, arguing that it provides cooperation and interaction, and supports learning through humanistic communication.

On another note, in an organisation, knowledge can be categorised into explicit and tacit. Explicit knowledge may include such things as manuals, instructions, descriptions, or formulas which can be documented and shared. Despite cooperative efforts, the majority of companies and communities can access this type of knowledge as it is possible to store it in a shared database. The other type, Tacit knowledge, is totally the opposite as it exists in humanistic perceptions and behaviours. This type of knowledge may consist of things like thoughts, insights, and beliefs. So, as tacit knowledge is reliant upon context, it is not easy to formalise it or share it with other parties (Jabar, 2012).

Within the context of knowledge transfer, there are number of aspects drawn from organization science (Pawlowski and Robey, 2004), the following will describe some of them.

2.4.2.1 Situated Learning and Community of Practice

This type of learning originates from the belief that knowledge can be gained socially, through perception rather than through direct learning. Learning by social context is defined as a community of practice, in which it is represented by people gathering informally over common goals. So, this community is distinguished by the shared style of activity and that incidents are interpreted (Pawlowski and Robey, 2000). Such a community

> "…includes the language, tools, documents, images, symbols, well-defined roles, specified criteria, codified procedures, regulations, and contracts that various practices make explicit.... it also includes all the implicit relations, tacit conventions, subtle cues, untold rules of thumb, recognizable intuitions, specific perceptions, well-tuned sensitivities embodied understandings, underlying assumptions, and shared world views" (Wenger, 1998, p. 47).

Moreover, each community of practice has its own view for the world, represented by values, meanings and shared knowledge (Brown and Duguid 1998). In this learning process, members gain knowledge through interaction and communication with professional members. What makes the community of

practice theory more interesting is its concerns with relations across communities and within communities (Brown and Duguid 1998).

2.4.2.2 Broker

A broker is defined as a person who acts as a connection between communities of practice, in order to facilitate information transfer between them and introduce new opportunities to learn. A broker may be barely related to a community or may belong to another community entirely (Wenger, 1998). Such a role provides numerous benefits, for instance it maintains the units' core proficiency. Furthermore, this role prevents the proficiency from becoming rigid by presenting the knowledge of the organisation's staff, which in turn, leads to further appreciation and understanding based on the given information (Leonard-Barton, 1995). Moreover, the broker may still be involved in some of community's activities (Pawlowski and Robey, 2004).

2.4.2.3 Translation

Since each community of practice has its own elements (i.e. language, tools, symbols, regulations), which have specific meanings according to their social construction, it is necessary to frame these elements in a way that is understandable or sympathetic to another community's view (Pawlowski and Robey, 2004). Translation is therefore particularly important in that it makes communication between two communities understandable, and this is the main purpose of knowledge brokering.

2.4.2.4 Knowledge Artefacts

According to Kirsch (2008), in an organisation, the knowledge artefact includes everything people use daily, such as "any piece of documentation: memos, notes, emails, directories, articles, white papers etc". In addition, it includes non-physical things such as "thoughts, conversations, recollections, stories, and metaphors". Furthermore, the knowledge artefact can be implicit or

explicit, or even a mixture of these two forms based on how it is used, which in turn has an impact on knowledge flow and utilisation. The procedure of knowledge management includes managing the knowledge-holders as well as managing the process which controls the flow. However, it seems that the rules for this process do not clearly explain the reasons for carrying out each particular step. As a result, using artefacts seems necessary in order to recognise these reasons. Therefore, identifying and employing the knowledge artefact appears crucial in developing useful knowledge within an organisation.

Additionally, Bechky (2003) argues that a number of previous studies (Winner, 1980; Star and Griesemer, 1989, and Henderson, 1999, cited in Bechky, 2003) have considered the artefact as one of the crucial features of life within an organisation. This is because this artefact has the ability to enforce the relationship between various communities. In addition, identifying and studying this artefact helps shed light on the social dynamics among various occupational parties. For instance, people who work together to deal with a problem or to maintain the flow of a process.

2.4.2.5 Object Roles

According to Star (2010), the object is something that humans interact toward and with. In addition, it has material dimensions which might be derived from action. Moreover, Nicolini et al (2012) suggests that, in the field of cross-disciplinary collaboration, objects offer motivations for collaboration emergence, allow actors to perform across the boundaries, and establish a base for the activity's infrastructure. In addition, such objects 'embed' and store the knowledge (e.g. sketch of machinery parts) which makes them useful when it comes to dealing with issues (Bechky, 2003). In addition, with various involved actors in a collaborated case, an object may perform a number of roles at any time. Thus, this object may act as motivator and at the same time act as background. This depends on the engaged actors (Nicolini et al, 2012). In this sense, Orlikowski (2002) pointed out that in order to clarify object roles, focus

should be on the practice of experts who collaborate from a range of fields. The following discusses three types of objects.

(1) Boundary Object

> "[It defined as]…artefacts of practice that are agreed and shared between communities, yet 'satisfy the informational requirements of each of them'...[they] extend the notion to business tools, many of which are familiar in project environments — 'shared documents, tools, business processes, objectives, schedules'" (Sapsed and Salter, 2004, p. 1518)

This concept was first introduced by Star (2010, p. 46), who asserts that "a boundary object 'sits in the middle' of a group of actors with divergent viewpoints". A boundary object is any object that is related to more than a community of practice, at the same time, it is viewed differently by each community. Using boundary objects offers a common language that allows knowledge to reshaped in a way which is more familiar to other parties, thus it offers a form of shared meaning which various actors can react with (Nicolini et al, 2012). Numerous studies suggest the boundary object works as a device which translates and transforms the knowledge across the rigorous boundaries between various professions groups. So, this type of object provides concrete means to identify and study more with respect to the differences and dependencies through boundaries (Carlile, 2004 and Nicolini et al, 2012). In addition, this object could be a tool, a document, a concept or any other form that provides an interconnection (Brown and Duguid, 1998; Wenger, 1998). Moreover, within the literature, numerous objects were discussed as boundary objects. This includes for example:

> "repositories, standardized forms, sketches and drawings, workflow matrices …, physical and IT objects, prototypes …, and more abstract objects such as metaphors …, narratives …, or processes and methods" (Nicolini et al, 2012, p. 616)

Nicolini et al (2012) and Trompette and Vinck (2009) suggest that, limiting the application of an artefact as a boundary object may marginalise the

deep analysis. Moreover, introducing such an object may simplify the articulation model between two parties via this object, which in a way ignores the complexity of interactions between them. This means, this generalisation of using the concept of boundary objects to explain everything, actually, explains nothing. Therefore, it seems crucial to identify different types of object roles, as this would introduce a comprehensive understanding with respect to object's potential participation in the knowledge transfer process.

(2) Epistemic Object

This material object is created as an attempt to forefront the powers that drive the development of knowledge. It is an inquiry or epistemic object, and it contains knowledge which is no one yet known, thus it represents "wanting" dynamics and the lack of fulfilment as discussed in psychoanalysis. In other words, such knowledge objects "resemble an open drawer filled with folders extending indefinitely". Moreover, this type of object is neither perfect nor complete, in terms of generated power and sentimental investment on the scientist's side. The trials to fill this gap in knowledge lead to strengthen the role of this type of objects (Nicolini et al, 2012, p. 618).

In simple terms, the nature of this type of object is abstract and characterised by a lack of the sense of completeness. Moreover, they are recognised as objects of pursuit and investigation which identify what they are and what they are not. Also, the involved parties from various practices can interact with this type of object and develop the process by contributing. So, such objects help to connect ideas which may produce new queries as a result of answering others, thus, this reason why this type of object is not determined or completely formed. Additionally, this object seems useful in epistemic work even in cases where it does not span through practice boundaries. Examples of this type of object include "physical structures, chemical reactions and biological functions" (Ewenstein and Whyte, 2009, p. 9).

(3) Activity Objects

This type of object is derived from the concept of activity theory:

> "an analytical framework that allows us to apprehend organisations as arenas where multiple strands of sociohistorical contexts manifest themselves in the conduct of everyday activities ... It is through the manipulation of a number of tools and different forms of interaction that sociohistorical constructs manifest themselves in situated practice." (Groleau et al, 2012, p. 653)

This theory proposes that peoples' activities are involved with a number of artefacts which aid achievements. Furthermore, such artefacts allow attitudes to be determined, link social environments with their actors, and implant practice history. Thus, activity objects are concerned with the inherently oriented collective action of an object. Due to the result of activity outcome, this type of object offers meaning, direction, and motivation which are associated with the activities when they are complete. So, activity objects share the idea of being an effective motive as the epistemic object does, also, they are described as a tool of translation between various groups like the boundary object.

The activity object is characterised as being partially given and partially emergent. This means the activity object is the outcome of the community's gathering and interest around it, like the producing an equipment according to regulations that a group of labour uses. At the same time, activity object seems to be emergent (i.e. projective) in that it is created during negotiation and preferring some interests over other within the community.

In addition, each party wants to preserve its particular interests which should not be excluded by the emergent situation of this object. As result of this point, each party may impact on the preliminary imaginary thoughts of this object and on its recognised nature in reality.

Activity object is known as it activates discussions and contradictions. In this respect, such an object derived from the perception of activity theory, it

gathers number of various techniques, abilities, and theoretical instruments from the involved parties, and then engages them into the negotiation. Thus, this object receives several of viewpoints, interests, and understandings which likely seem to be significantly contradicted as each of them is deeply rooted in dissimilar professions. Added, the contradiction could present in the form of tension as result of contrary opinions and benefits. Consequently, this contradiction seems useful in terms it provides a work space for collaboration and dealing with the challenges, in addition, it opens doors for innovation as it stimulate extensive learning.

Furthermore, due to the material nature of this object, it is able to retroact to its creator's community with an impact (i.e. "bite back") (p. 621). As such, this impact depends on how each involved party responds to this object. Also, this impact may influenced by one party's complicated business roles, which the other party should deal with. (Nicolini et al, 2012).

The following Table 2.4 shows the main characteristics of the above discussed objects' roles.

Table 2.4: Main Characteristics of Boundary, Epistemic, and Activity Objects

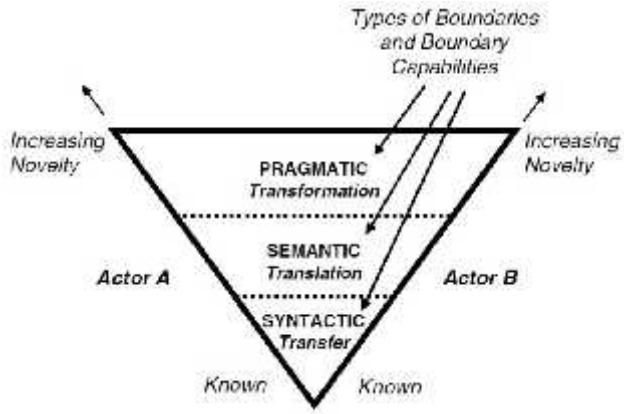
	Boundary objects	**Epistemic objects**	**Activity objects**
Affordances of objects in cross-disciplinary settings	Objects act as translation and transformation devices across various thought worlds. They make cross disciplinary work possible.	Objects fuel cooperation and generate mutuality and solidarity by triggering desire and attachment and creating mutual dependencies.	Objects motivate the collaboration and direct activities. They hold together different types of knowledge, and in so doing, they generate contradictions and trigger innovation.
Completeness of objects	Objects are open and malleable only inasmuch as they are Interpretively flexible across boundaries.	Objects are incomplete, emergent, and expansive, which gives them their performative character.	

Source: Adopted from (Nicolini et al, 2012, p. 624)

2.4.2.6 Knowledge Boundaries

Investigating the context of innovation provides an opportunity to learn more about knowledge transfer across boundaries. In this respect, a study by Carlile (2004) discussed the characteristics of three types of knowledge boundaries. The first of these is 'Syntactic' (the most basic boundary) which presents informational dissimilarities. The recommended method to deal with challenges here is 'Transferring Knowledge' (i.e. store and retrieve it) to establish a common understanding. The second boundary is the 'Semantic' one, in which different interpretations are developed. Here, creating shared meanings by using the 'Translating Knowledge' method is important, in order to make knowledge sharing and assessing possible. The third boundary is 'Pragmatic', where the various interests of diverse groups build an obstacle, so there is a need to create common interests by 'Transforming Knowledge' into a form which everyone can interact with. Carlile's study (2004) led to the creation of an 'Integrated Framework for Managing Knowledge across Boundaries' (see Figure 2.4).

Figure 2.4: Framework for Managing Knowledge across Boundaries



Source: Adopted from Carlile (2004, p. 558)

Furthermore, Carlile's (2004) study considered the following: dealing with knowledge as something that can be stored and retrieved, realising the significance of having a common meaning to share knowledge between actors, and understanding the impact of how different interests may lead to obstructing

knowledge sharing. In addition, three properties of knowledge at each boundary are discussed. First, 'Difference', which refers to the dissimilarities of expertise, or domain specific, or amount of knowledge that each actor has. Second, 'Dependence', which is defined as a situation where two involved parties count on each other to achieve a shared target, like workers on production assembly line, or co-authors writing a term-paper. Third, 'Novelty', reflects "how novel the circumstances are". In other words, Novelty includes the new involved developments in terms of the data and narrative by each actor. So, the apparent source of novelty is the customer who requires the proposed IS solution. The following Table 2.5 summarises the approaches used to share and assess knowledge across the aforementioned boundaries in the framework.

Table 2.5: A Summary of Knowledge Boundaries, Situation, and Method

	Boundary	Situation	Methods
↓ ↓ ↓ **Novelty Increasing** ↓ ↓ ↓	**Syntactic**	A common lexicon should be created in order to identify differences and dependencies between involved parties. And considering it as a start point, where the rest of process is building on this one.	**Transferring knowledge** (store and retrieve), or information processing.
	Semantic	The increasing data creates number of differences and dependencies that are unclear, which may lead to different interpretations. So, a shared meaning should be created using common meaning, in order to make it possible to share and assess knowledge at this level.	**Translating knowledge** by emphasizing the roles of brokers and translators to facilitate knowledge flowing. Furthermore, the actors can negotiate and try to change the interest.
	Pragmatic	The increasing data creates various interests among actors which may obstruct the ability to share and assess knowledge. Thus, there is a need to create a common interests to transform knowledge and interests. Moreover, it affords a sufficient means to share and assess knowledge at a boundary.	**Transforming Knowledge** by introducing boundary objects (i.e. prototyping and drawing). Also, more negotiation takes place as a "trade-off" process.

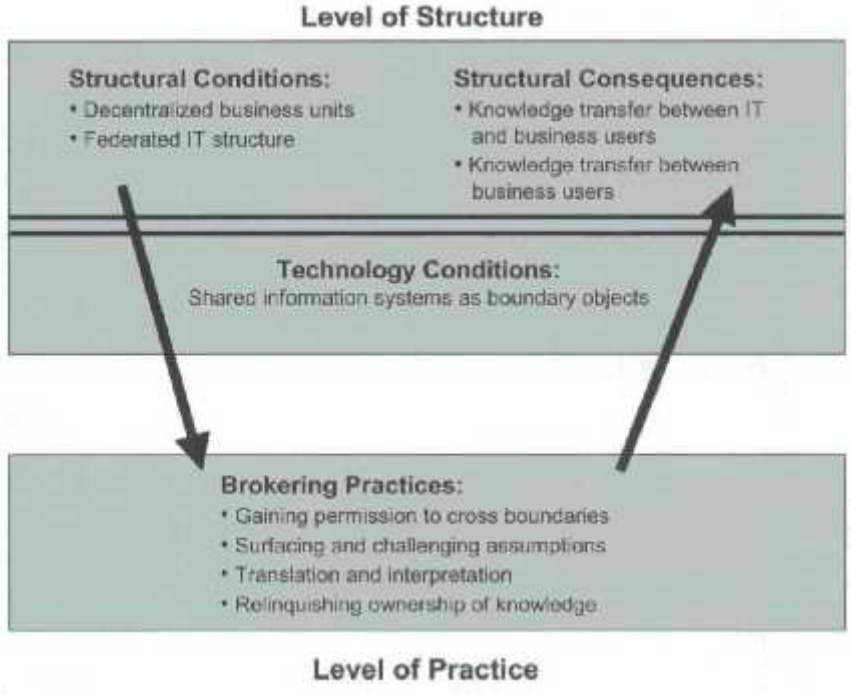
Source: Developed by author based on the study of (Carlile, 2004)

The aforementioned covered some aspects related to knowledge transfer which drawn from organization science literature. The next section will focus on the role of Information Technology (IT) professionals to transfer the knowledge in an organisation.

2.4.3 Knowledge Transfer and the Work of IT Professionals

In order to explore the perception of knowledge brokering within IT practice, Pawlowski and Robey (2004) conducted 23 semi-structured interviews with business customers and IT professionals who worked at different management levels, in a large company. Twelve themes were identified from data analysis, which were classified into four categories, namely: the position of IT professionals; shared systems as boundary objects; brokering practices and the consequences of brokering. Based on these categories, the following model was developed. See Figure 2.5.

Figure 2.5: The Framework for Understanding Knowledge Brokering by IT Professionals



Source: Adopted from Pawlowski and Robey (2004, p. 663)

According to this model, professional IT staff are assigned to act as brokers between the community of IT people and the community of business customers. The first step for the IT professional was to join and interact with the community of business customers. As a result, IT professionals were able to bridge the boundaries with business units. With the significant aid of a shared IS system, brokering the knowledge of both IT and business became possible. The process required numerous activities, like gaining authorisation to pass unit boundaries, challenging traditional user's attitudes towards current processes, interpreting and assimilating various business units, and handing over the right of IS solution to the users.

According to the results, IT professionals are in an effective position to transfer knowledge between separated communities. This suggests that, as a profession, it has a broader role. At the same time, using a shared information system, as a boundary object, has a positive effect on the transferring process. Therefore, combining technology with human effort is significant here.

2.4.4 Dealing with Knowledge Transfer Challenges

Based on the aforementioned, this research will focus on the process of knowledge transfer in IS development projects. In this respect, knowledge transfer is concerned with how the customer can inform about the required features of the proposed IS product, such as expected functions, applied business roles, and screen designs. At the same time, knowledge transfer is concerned with the way in which developers can effectively receive and properly understand these pieces of information in order to identify the needed requirements (McConnell, 1996). Thus, it seems successful or complete knowledge transfer in this context relates to efficiency and effectiveness of the received knowledge (Perez-Nordtvedt et al, 2008). This is important when responding to challenges of incomplete knowledge transfer in IS development projects. Particularly, this area was highlighted within the research gap in the previous chapter.

Therefore, investigating and learning from successful RE applications within the profession itself is useful here. One of the possible and significant ways to achieve this is by investigating the usage of knowledge artefacts and various types of objects in bridging knowledge boundaries within the IS development practice. In this particular, up to author's knowledge, this investigation never considered before in the previous studies, which presents a new contribution in the literature.

Actually, investigating the artefact and the roles of such objects provides a sharper focus on the rich contents of practice-based theorising and emphasises the social relations which exist around development projects, particularly with the increasing call for "more empirical research into actual working practices" (Ewenstein and Whyte, 2009). Furthermore, Barrett and Oborn (2010) mentioned that there are a number of artefacts or objects incorporated within the practice of IS development which support the bridging of knowledge boundaries between developers (Agents) and customers (Principals). Such objects include requirement details and project management techniques. In addition, IT professionals, or IS development staff in this case, have the credibility in terms of the efficiency when it comes to transfer the knowledge (Pawlowski and Robey, 2004). Added, as knowledge transferring occurs between IT and various business practices, so learning from IS developers' activities seems to be more convenience. In this respect, these IS development staff are originally agents. Thus, there will be no additional cost for introducing a third party in the agency relationship. In addition, the relationship can be kept direct with limited complications. Additionally, it is important for practice to investigate how the IS project manager can deal with the knowledge transfer process, using various techniques and methods from real life applications.

2.5 Conclusion

This chapter has critically evaluated the available literature on IS project escalation thorough the viewpoint of Agency Theory. Firstly, the chapter started by defining IS project escalation. It then reviewed related studies and theories to explain such behaviour, and the process model of IS project escalation development. Secondly, the chapter introduced Agency Theory and its extension, and then critically evaluated IS project escalation literature by applying Agency Theory. This highlighted a research gap: the ignored assumption of the impact of the incompetent principal in terms of incomplete knowledge transferring to the agent. Thirdly, it demonstrated the importance in dealing with the issue of knowledge transfer incompetency and presented this as a possible way to deal with the challenge of IS project escalation. Therefore, this chapter reviewed a range of related literature in the area of knowledge transfer in IS development projects and has discussed some related concepts. Additionally, the importance of studying the successful application of RE process through investigating the role of incorporated objects to facilitate knowledge flow was highlighted, together with how to deal with the situation of incomplete knowledge transfer using techniques and tools by the IS project manager within the practice.

The next chapter will provide a review of the factor associated with the success and failure of IS projects.

Chapter 3: Critical Success and Failure Factors in IS Projects

3.1 Introduction

This chapter will provide further reading and shed light on critical success and failure factors in IS development project literature.

The purpose of this chapter is neither to critically examine these factors nor comprehensively explain them. Instead, the aim is to provide a background and to support prior research with respect to these factors. Because it is highly expected the interviewees will mention a number of these factors when discussing their perceptions regards what may impact on knowledge transfer process and project outcome. So, this background will therefore influence the analysis and improve the concluding discussion regarding the findings.

3.2 IS Development and ERP Critical Factors

3.2.1 Literature Review

In order to compete in the business and achieve more, organisations increasingly invests in IS solutions to improve business functionality and speed up processes. In this respect, systems of enterprise resource planning (ERP) are considered advanced IS models that integrate information provided by each department across the organisation. In addition, it offers various necessary business functions. Furthermore, in response to the rate of failed ERP implementations, frequent studies have investigated and highlighted a number of critical success factors (CSFs) that impact on the implementation process. In addition, recognising such factors will increase the chances of meeting significant achievement levels, lead to better system quality, and save on time and cost. Additionally, learning the procedure of figuring out these factors will support setting the required awareness. It will also enable clarification of information types and foster the avoidance of any challenges the organisation

may face during implementation (Finney and Corbett, 2007). The following will review some of these studies.

The study of Finney and Corbett (2007) critically explored the available literature with respect to CSFs of ERP implementation to distinguish any possible gaps. To do so, they reviewed 70 articles in the field of management information systems (MIS) from 12 well-known journals (e.g. Information & Management, Journal of Management Information Systems, MIS Quarterly), and 5 databases (e.g. ABI/Inform Global, CBCA Business, Proquest European Business).

Next, by using inductive coding and content analysis, general 55 factors were initially identified. Further analysis reduced them to 26 factors which were grouped within two categories as showed in Table 3.1.

Table 3.1: Strategic and Tactical CSFs for ERP Implementation

Strategic critical success factors	**Tactical critical success factors**
• Top management commitment and support • Visioning and planning • Build a business case • Project champion • Implementation strategy and timeframe • Vanilla ERP • Project management • Change management • Managing cultural change	• Balanced team • Project team: the best and brightest • Communication plan • Empowered decision makers • Team morale and motivation • Project cost planning and management • BPR and software configuration • Legacy system consideration • IT infrastructure • Client consultation • Selection of ERP • Consultant selection and relationship • Training and job redesign • Troubleshooting/crises management • Data conversion and integrity • System testing • Post-implementation evaluation

Source: Adopted from (Finney and Corbett, 2007, p. 335)

The findings of the study of Finney and Corbett (2007) identified the concept of change management, which seems to have more than a definition with a lack of explanatory details.

In addition, some potential evidence it that there is almost no research that has considered the perception of other groups of stakeholders (e.g. wholesalers, customers, suppliers). Traditionally, the focus has mainly been on managers. This reflects the need for further studies which consider the viewpoint of external stakeholders in order to strengthen understanding with respect to CSFs aspects, and to raise the overall possibilities to succeed ERP implementation.

In another recent study, Ziemba and Oblak (2013) suggested that in order to cut cost, enhance the quality of products, and raise the rates of productivity and customer satisfaction, it is important to improve the performance process of the business. Thus, there is a need to consider the business as a net of linked processes in addition to the construction of their functions. This has shed the light on process approach related concepts, namely business process management, business process orientation, and process-based organisations. This application of process management usually needs the support from IS and IT. Thus, the role of ERP seems useful here in that it combines the finest of both IT applications and business practices. Hence, the aim of their study was to investigate the CSFs of the successful implementation of ERP systems, and to clarify business process management nature in the Polish public administration. The study was concerned with an implementation of ERP systems in significant governmental agencies in Poland. Additionally, it employed a number of techniques and methods to meet research aims, like action research, creative thinking, logical deduction, and critical analysis of literature.

The literature review identified a number of CSFs according to the viewpoint of various authors. Table 3.2 summaries these factors and their categorisations.

Table 3.2: CSFs for ERP Systems Implementation According to Different Authors

Somers and Nelson (2001) **22 CSF's**	**Hairul, Nasir, and Sahibuddin (2011)** **26 CSF's**	**Alaskari, Ahmad, Dhafr, and Pinedo-Cuenca (2012)** **22 CSF's**
• Top management support • Project champion • User training and education • Management of expectations • Vendor/customer partnerships • Use of vendors' development tools • Careful selection of the appropriate package • Project management • Steering committee • Use of consultants • Minimal customization • Data analysis and conversion • Business process reengineering • Defining the architecture • Dedicated resources • Project team competence • Change management • Clear goals and objectives • Education on new business processes • Interdepartmental communication • Interdepartmental co-operation • On-going vendor support	**People-related factors** • Effective project management skills/methodologies (project manager) • Support from top management • User/client involvement • Skilled and sufficient staffs • Good leadership • Committed and motivated team • Good performance by vendors/contractors/ consultants **Process-related factors** • Clear requirements and specifications • Clear objective/goal/scope • Realistic schedule • Effective communication and feed-back • Realistic budget • Frozen requirement • Proper planning • Appropriate development processes/methodologies (process) • Up-to-date progress reporting • Effective monitoring and control • Adequate resources • Risk management • Effective change and configuration management • Good quality management	• Top management support • User training and education on software • Business process reengineering • Project management • Effective communication • Change culture • Clear goals and objectives • Use of consultants services • Interdepartmental cooperation • Upgrading infrastructure • Financial resources • Project team organisation and competence • Legacy system management • Change management • Vendor support • Project champion • System technological • ERP package selection • Data accuracy • Sponsorship • Minimal customization Project manager

Table 3.2: CSFs for ERP Systems Implementation According to Different Authors **(Continue)**

Somers and Nelson (2001) 22 CSF's	**Hairul, Nasir, and Sahibuddin (2011) 26 CSF's**	**Alaskari, Ahmad, Dhafr, and Pinedo-Cuenca (2012) 22 CSF's**
	• Clear assignment of roles and responsibilities • End-user training provision **Technical-related factors** • Familiar with technology/development methodology • Complexity, project size, duration, number of organisations involved Supporting tools and good infra-structure	

Source: Adopted from (Ziemba and Oblak, 2013, p. 7)

The outcome of that study listed a number of factors for public administration, which are similar to ones in business organisations. Actually, in terms of categorisation, new categories are introduced which are more correlated to public administration, Thus, this reflects the differences between public and private organisations in terms of process nature. Table 3.3 summarises the identified factors and their categories.

Table 3.3: CSFs for ERP Systems Implementation in Public Administration

Factors related to public procurement procedure	Factors related to government processes management	Factors related to project team competences	Factors related to project management
• Clear and precisely defined tender specification (information and government processes requirements, technological requirements, organisation Organisational requirements) • Realistic and chronologically arranged schedule • Clear goals and objectives of the ERP system	• Frozen information requirements • Identified government processes • Government process reengineering	• Project team competence on ERP systems • Project team competence on public ad-ministration • Use of consultants • Cooperation with research centres • Expertise in IT	• Top management support • Clear assignment of roles and responsibilities • Change management • Risk management • Involvement ERP system end-users • Interdepartmental communication • Use of proven project management methodology • Effective monitoring and control

Source: Adopted from (Ziemba and Oblak, 2013, p. 10)

The study of Peterson et al (2002) pointed out the hugely increasing number of IS development organisations and IS applications, which cross various cultures and nationalities. This emphasises the significant variances in the perception of IS designers from different countries. Particularly, globally wise, these variances seem to represent a critical factor when it comes to the expected challenges of IS implementation, or even when it comes to what encourages successful IS implementation. In addition, that study considers the application of Attribution Theory with respect to its impact on the IS designer, in terms of their feelings regarding the importance that critical factors have in terms of the success and failure of the implementation of IS development projects.

The study collected data through the questioner. 18 factors which were collected from a previous study and literature review were examined. In this respect, the study suggests opposing a critical success factor leads to a critical

failure factor. Table 3.4 provides details about these factors. Moreover, the sample included participants from a number of companies in three countries as follows: 78 responses from United States of America, 127 responses from Korea, and 46 responses from Japan.

Table 3.4: Eighteen IS (Failure) and Success Factors

IS Development Factors
• (Lack of) User participation in the project • (Ill) Alignment of project and corporate goals • (No attempt) Reengineering business process • (Lack of) Clearly stated objectives • (Lack of) Detailed project plan • (Im) Proper project scope • (Lack of) Project leader's feedback to team • (In) Experience of project leader • (Lack of) Project leader's project monitoring/ • control • (In) Adequate training for the team members • (Insufficient) Peer review on project progress • (In) Experience of team members • (Lack of) Team member commitment • (Lack of) Team member self-control • (Little use) Utilizing a prototype • Utilizing an (in) effective methodology • Use of (in) appropriate technology

Source: Adopted from (Peterson et al, 2002, p. 424)

The analysis distinguished five significant components as follows: Organisational Integration, Communication of Goals, Project Leader, IS Designers, and Development Techniques. Furthermore, there are some similarities in perceptions of the three countries. For instance, for all countries, the first two components were considered as the most effective ones. Additionally, the last two components turned out to be the least effective ones when it comes to contributing to the success or failure of IS development projects. In addition, some differences were identified, such as the responses from the USA rated the component of 'Communication of Goals' as a more important one than responses from Japan and Korea. Conversely, the responses from Japan and Korea identified the component of 'Characteristics of the Project Leader' as more important than the responses from the USA.

Based on this, further analysis in that study suggested that the responses from the USA seem to be consistent with the impact of self-serving bias from Attribution Theory. These responses presented internal factors (related to them) as the main reason of success, and on contrary they showed the external factors (related to others) as the critical reason of failure. The opposite situation emerged in the responses from Japan, while there was no significant evidence for any biases with respect to the responses from Korea. As such, it can be concluded that, in the USA, the reason why IS designers failed to learn from previous experience could be partially because of the impact of self-serving bias. More talking about self-serving bias impact is coming in section 9.3.1.3.

3.2.2 Section Conclusion

This review suggests that many previous studies have introduced a number of factors that impact on the success or the failure of IS projects. Though there are similarities identified factors among numerous studies, there are different ways of categorising them into groups. These differences are influenced by the viewpoint or the trend of certain studies. For example, it is possible to categorise them according to the relationship (e.g. people-related factors, process-related factors, technical-related factors), according to planning consideration (e.g. strategic factors and tactical factors), or according to the type of the organisation (e.g. governmental or private). Thus, this variety of conceptual ways of grouping factors opens doors for further investigation, and provides more explanation with respect to these factors in IS related studies.

3.3 Conclusion

This chapter has reviewed a number of critical success and failure factors in IS projects. That is in order to provide a reasonable background and to support prior research with respect to these factors.

The next chapter will discuss research design, methodology, the conceptual framework of this research, and then highlight data collection methods.

Chapter 4: Methodology and Research Plan

4.1 Introduction

Chapter 2 critically discussed the literature on IS project escalation through the viewpoint of Agency Theory (a notable research gap). Then it reviewed a number of related studies and concepts of knowledge transfer in IS development projects. This was in order to provide a possible solution to deal with the challenge of incomplete knowledge transfer.

Chapter 3 provided a background with respect to critical success and failure factors in IS projects by reviewing a number of related literatures.

This chapter will discuss the methodology and design of this research. The conceptual framework of this research will be outlined initially. This will be followed by a discussion of appropriate research methodology and methods. A description of research design in terms of the data collection stages and analysis strategy will also be provided.

4.2 Conceptual Framework

4.2.1 Introduction

According Walsham (1995), the next step after critically reviewing and establishing a significant background theory is to develop an abstract theoretical framework, in which this framework consider the reviewed related literature.

The conceptual framework represents an important part in research in that it results from critically reviewing literature and helps to clarify how research is designed in a certain way to deal with identified gaps. Later, it aids the development of the findings, and justifies conclusions' relationships with other studies (Leshem and Trafford, 2007). Moreover, this framework seems to act like a map that guides the researcher throughout the investigation (Miles and Huberman, 1984). In addition, it helps to theoretically offer a view towards

the anticipated study, and suggest an organisation with respect to the research process. So, it draws up plausible patterns and relationships to reach the addressed aims. In other words, this framework provides a space to outline ideas, and an instrument to logically sort through constructs. Additionally, it seems that using conceptual frameworks encourages paradigmatic thinking in that it reflects how the research sees the world according to humanistic comprehensions and perceptions (Kuhn, 1962). Moreover, following the conceptual framework guides effective data analysis. This in turn raises additional research questions which can be explored in future studies (Rudestam and Newton, 1992).

It is worth mentioning that when it comes to constructing conceptual frameworks, it is essential to clarify what the main intentions are. This helps the researcher to be selective in terms of picking critical features of the research and identifying relationships. Following a solid conceptual framework also helps the researcher recognise what data should be collected and how it should be analysed (Robson, 1993). As such, the conceptual framework is often regarded as a bridge that links the research paradigm to the practice of investigation (Leshem and Trafford, 2007). Moreover, such a framework can take a graphical form (such as a influence diagram) where the identified dependent and independent variables in the study are demonstrated (Rudestam and Newton, 1992). Moreover, “relationships are often presented visually in a flowchart, web diagram or other type of schemata” (Glatthorn, 1998, p. 87).

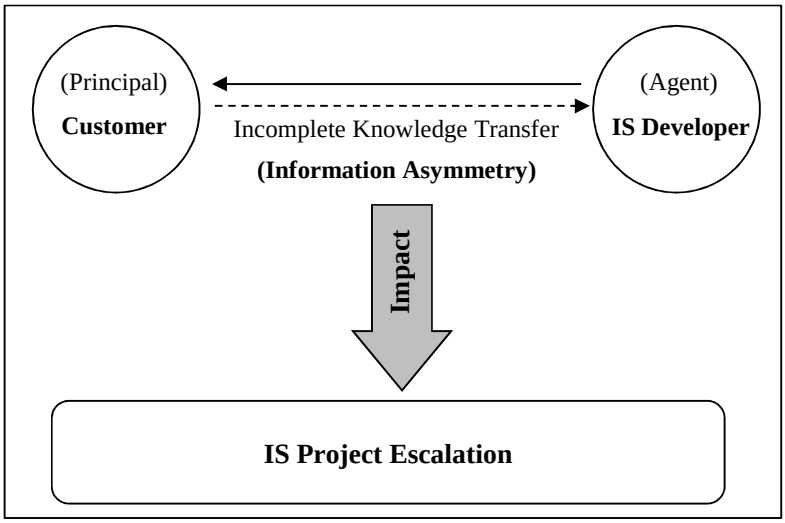
4.2.2 Research Aims Overview

This research contributes to current academic thinking by highlighting a new perspective, which drawn by the application of extended Agency Theory, to studying and dealing with the phenomenon of IS project escalation. This perspective assumes IS project escalation is resulted due to a situation of information asymmetry (i.e. incomplete knowledge transfer) at the side of the customer (Principal). In which, this customer (Principal) suffers the issue of incompetency when it comes to transfer the requirements (knowledge) to the IS developers (Agent) (Hendry, 2002). Therefore, IS project escalation is raised

due to the development and mishandling the challenge of incomplete knowledge transfer (Mahring and Keil, 2008).

The following Figure 4.1 visualises the setting which represents the suggested perspective of this research.

Figure 4.1: The Suggested Perspective to Investigate IS Project Escalation in This Study



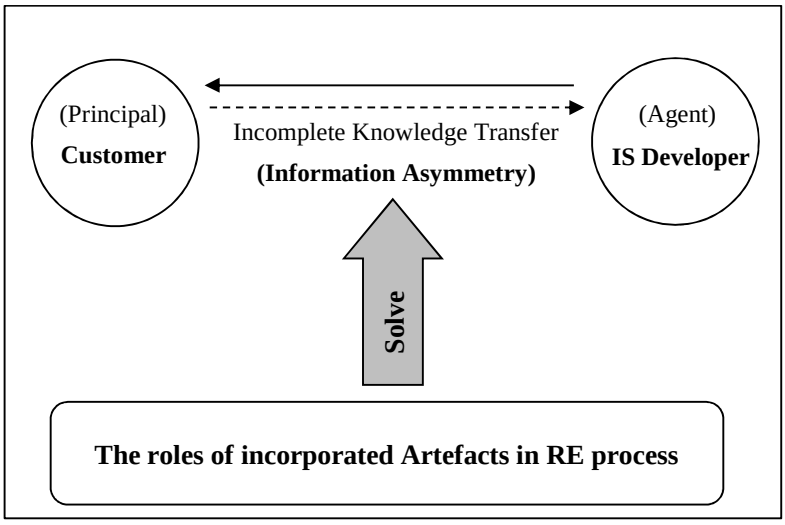
Source: Developed by the author

Thus, in order to empirically examine the proposed perspective above, the first aim this of this research is to investigate who the actors are, and what reasons are behind the two challenges in IS development projects, namely project escalation and incomplete knowledge transfer. In addition to identify the links between these reasons and involved actors in such projects.

Moreover, based on the same perspective, this research suggests solving the situation of information asymmetry, in terms of dealing with challenge of incomplete knowledge transfer, is necessary to handle the challenge of project escalation in the first place. Therefore, the second aim of this research is to investigate the RE process, in order to identify the incorporated artefacts within this process. In this respect, these artefacts or

objects represent a strength matter as they facilitate knowledge flow between customers and IS developers (Barrett and Oborn, 2010). Therefore, learning how these objects are created and utilised, in addition roles they act, will significantly improve the process of RE (Chakraborty et al, 2010; Urquhart, 1997; Mathiassen et al, 2007). The following Figure 4.2 helps visualise the relation between the suggested perspective of this research, and the investigation goal in the second research aim.

Figure 4.2: The Relationship between Suggested Perspective of this Research and the Investigation Goal in the Second Research Aim

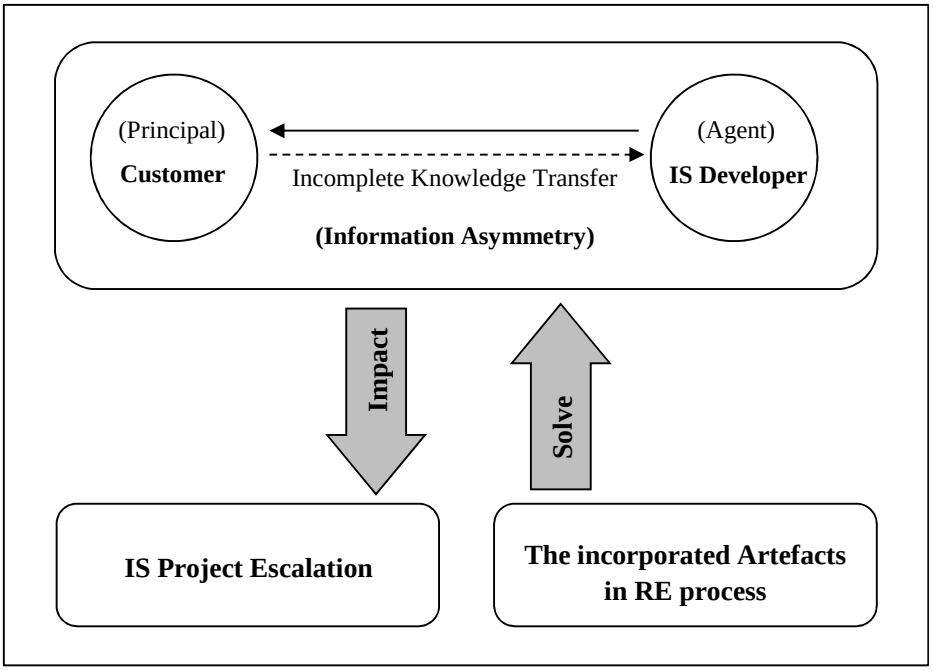


Source: Developed by the author

4.2.3 Developing Research Conceptual Framework

In the previous section, Figures 4.1 and 4.2 were developed to present the suggested perspective of this research and to foster the study of the phenomenon of IS project escalation. At the same time, these two figures considered the aimed investigations of this research. In this respect, Figure 4.3 shows the suggested framework for this research.

Figure 4.3: The Conceptual Framework of this Research



Source: Developed by the author

At the top of the conceptual framework, there is a visualisation with respect to the suggested perspective to investigate IS project escalation in this research. In this respect, the horizontal arrows between the circles of actors clarify the challenge of incomplete transfer because of the customer (Principal). Such challenges create a situation of Information Asymmetry. Moreover, the left vertical grey arrow points to the (Impact) of this situation of Information Asymmetry on the phenomenon understudy (i.e. IS project escalation) as clarified in the box at the lower left corner. Furthermore, the other grey arrow points to how to (Solve) the challenge of incomplete knowledge transfer by learning about (the incorporated objects in RE process) as shown in the box at right lower corner of the framework.

This framework intends to present the employed theoretical perspective of this research in a more understandable and transparent way. As such, this perspective is based on critically reading a wide range of literature (Walsham, 1995). In this respect, the concepts of agent, principal, and the situation of information asymmetry are adopted form the context of Agency Theory

(Hendry, 2002). Further example, the role of the incorporated objects in RE process is implemented form the context of Knowledge Transfer in IS practice (Barrett and Oborn, 2010). Moreover, this framework offers a theoretical view towards the anticipated study, and points out the areas of interest to be explored. Thus, it clarifies the concerns of this research, and it guides where the investigation should focus on (Miles and Huberman, 1984). In this respect, according to above conceptual framework, the focus of this research is set to verify the impact of the situation of information asymmetry on IS project escalation. In addition this research is concerned with solving the challenge of incomplete knowledge transfer by studying the role of the incorporated objects in RE process.

Though, it might be argued, this framework may not cover all the expected theoretical components before starting the empirical investigation. In this respect, the conceptual framework is expected to be at an abstracted level in an early stage of research (Walsham, 1995). Moreover, when conducting an inductive study, it is allowable to introducing the conceptual framework after the fieldwork. So, at that time, the conceptual framework will reflect the outcomes of the empirical investigation, in which servers the purpose the exploratory nature of inductive studies (Leshem and Trafford, 2007). Conversely, in deductive studies, where the aim is to test a theory, a concert conceptual framework is identified according to a theoretical perspective (i.e. literature review). In which, this framework expresses the hypothesis to be examined in operational terms. Thus, conceptual framework must be conceived before undertaking the empirical study. In this respect, section 4.4 will discuss and justify adopting the inductive approach in this research. Therefore, this research highly expects to develop more enhanced frameworks, in terms of covering additional theoretical components, providing clarifying explanations the links between these components, and strengthening conclusions that lead to establishing theories. Therefore, the developed conceptual framework at this stage of research suites the purpose of offering insights and outlines for the researcher to carry on with the investigation, rather strictly obeying its guidelines as a constitution (Weaver-Hart, 1988).

4.2.4 Guiding the Analysis of the Research's First Aims

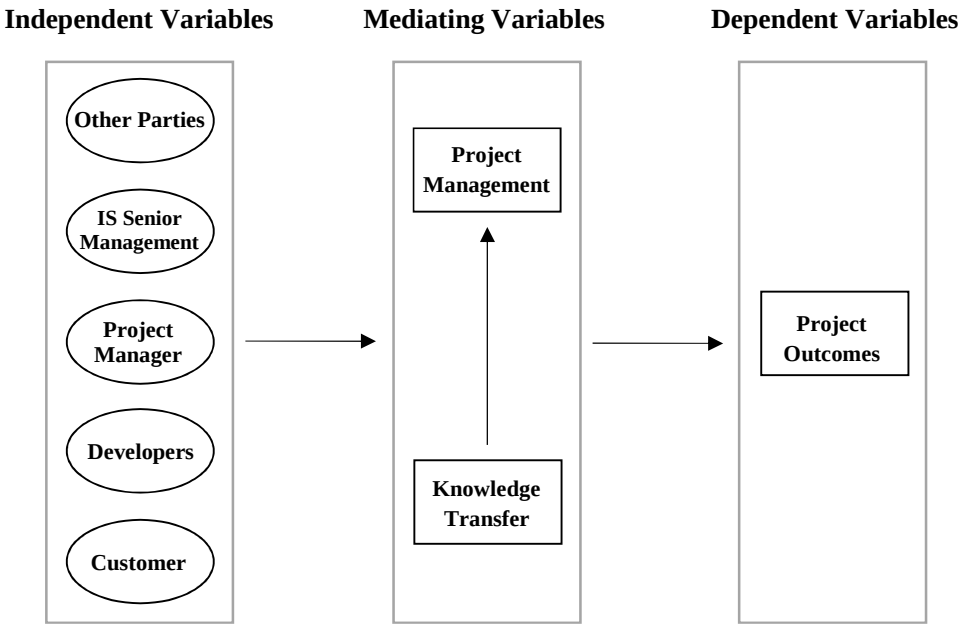
This section will develop an enhanced framework which addresses the first research aim. In which this aim concerns with the involved actors and reasons behind the issues of incomplete knowledge transfer and project escalation, in addition to figure out the links between these two issues.

Noteworthy, testing the proposed enhanced framework is none of this research's intentions. Actually, this framework will guide the analysis and support identifying the expected variables (i.e. actors and reasons), and the relationships between these variables. That is to develop an influence diagram which visualises and meets the goal of this research's first aim.

Moreover, section 4.6.1 will discuss and justify adopting the tool of interviewing to collect the data in this research. In this respect, it is expected the interviewees will advise a number of theoretical components when discussing their perceptions regards what may impact on knowledge transfer process and project outcome. Therefore, depending on the reviewed literature in chapter 3, regarding the factors associated with the success and failure of IS projects, to develop the enhanced framework sounds eventually useful.

Thus, the framework in Figure 4.4 is suggested to address the first research aim, and to guide the aim's related analysis.

Figure 4.4: The Suggested Enhanced Framework to Address the First Research Aim



Source: Developed by the author

The following discusses the components and the development of this framework.

Independent Variables

Reviewing the critical success and failure factors in IS development related literature reveals that it is possible to group these factors in a number of ways, according to research assumptions and analysis. Moreover, when considering the factors that relate to people or actors (who represent the independent variables), it is possible to recognise a number of them, for instance: customers, developers, project managers, IS higher management, and other parties. It is particularly important to consider the impact of stakeholders other than IS managers in IS development studies (Finney and Corbett, 2007).

The idea of identifying the customers and the developers was originally inspired by the application of agency theory. Though the main focus in this research is set on the customer, considering the influences of other actors will support understanding and enrich comprehension with respect to the research

topic. Besides, this helps to control for any possible bias in terms of only focusing on the customer's attitude. Table 4.1 shows examples of the related factors for each of these actors.

Table 4.1: Examples of Critical Factors to Support the Identified Independent Variables

Independent Variables	**Example of Related Factors**
Developers	• Project team: the best and brightest (Finney and Corbett, 2007) • Project team competence (Somers and Nelson, 2001) • Committed and motivated team (Hairul et al, 2011) • Adequate training for team members (Peterson et al, 2002)
Project Manager	• Effective project management skills/methodologies (project manager) (Hairul et al, 2011) • Good leadership (Ziemba and Oblak, 2013) • Project manager (Alaskari et al, 2012) • Experience of project leader (Peterson et al, 2002)
IS Higher Management	• Top management commitment and support (Finney and Corbett, 2007) • Top management support (Alaskari et al, 2012)
Other Parties	• Interdepartmental communication (Somers and Nelson, 2001) • Use of consultant services (Alaskari et al, 2012)
Customer	• User training and education (Alaskari et al, 2012) • User/client involvement (Hairul et al, 2011) • User participation in the project (Peterson et al, 2002)

Source: Developed by the author

Mediating Variables

This research mainly aims to investigate the impact of the customer's attitude, one of the identified actors on project operation and outcome. The research will also explore this actor's impact on the issue of incomplete knowledge transfer, and identify whether this is a critical reason behind IS project escalation. This highlights two mediating variables: Project Management, which is concerned with the impact on project operation, and

Knowledge Transfer, which relates to the challenge of information asymmetry. Table 4.2 offers examples of the related factors for each of these two mediating variables.

Table 4.2: Examples of CSFs to Support the Identified Mediating Variables

Dependent Variables	**Example of related CSFs**
Project Management	• Implementation strategy and timeframe (Finney and Corbett, 2007) • Project management (Finney and Corbett, 2007) • Project cost planning and management (Finney and Corbett, 2007) • Troubleshooting/crises management (Finney and Corbett, 2007) • Realistic schedule and budget (Hairul et al, 2011) • Appropriate development processes/methodologies(Hairul et al, 2011)
Knowledge Transfer	• Business process reengineering (Somers and Nelson, 2001) • Clear goals and objectives (Somers and Nelson, 2001) • Clear requirements and specifications (Hairul et al, 2011) • Frozen requirement (Hairul et al, 2011) • Utilizing a prototype (Peterson et al, 2002)

Source: Developed by the author

Dependent Variables

Project outcomes represent the final results of all previous components. In this respect, IS project escalation is one expected outcome in particular which reflects the topic and interest of this research. Actually, as these factors contribute to project success and failure outcomes, then it is expected the final developed model can be utilised to address these two outcomes.

Relationships between Variables

Figure 4.4 pointed out some suggested links between the variables in the enhanced framework. The following Table 4.3 shows examples of CSFs to support the identified links.

Table 4.3: Examples of CSFs to Support the Suggested Links between the Variables

Variable	Relation with	Example of related CSFs
Customer	Knowledge Transfer	• User participation in the project (Peterson et al, 2002)
	Project Management	• User/client involvement (Hairul et al, 2011)
Developers	Knowledge Transfer	• Data analysis and conversion (Somers and Nelson, 2001) • Business process reengineering (Somers and Nelson, 2001)
	Project Management	• Appropriate development processes/methodologies (process) (Hairul et al, 2011) • Committed and motivated team (Hairul et al, 2011)
Project Manager	Project Management	• Risk management (Hairul et al, 2011) • Use of proven project management methodology (Ziemba and Oblak, 2013) • Effective project management skills/methodologies (project manager) (Hairul et al, 2011)
IS Senior Management	Project Management	• Top management commitment and support (Finney and Corbett, 2007) • Support from top management (Hairul et al, 2011)
Other Parties	Project Management	• Use of consultants (Hairul et al, 2011) • Good performance by vendors/contractors/ consultants (Hairul et al, 2011) • Interdepartmental cooperation (Alaskari et al, 2012)
Knowledge Transfer	Project Management	• Clear goals and objectives of the ERP system (Ziemba and Oblak, 2013) • Clear objective/goal/scope (Hairul et al, 2011) • Clear goals and objectives (Somers and Nelson, 2001)

Source: Developed by the author

It is worth mentioning, Knowledge Transfer has links with the customer and the developers, as these two actors are the involved parties in RE process. At the same time, Knowledge Transfer has link with Project Management, in terms of setting the project plan, which considers project's scope, depends on customer's ideas. Additionally, the aim of managing a project is to achieve project goals, in which these goals represent customer's requirements as well.

The next section will discuss research philosophy and paradigm.

4.3 Research Philosophy and Paradigm

The aim of any research is to find the answers to the questions addressed by the research itself. Moreover, doing a research or claiming for knowledge requires establishing philosophical assumption about what to study and how to study. In this respect, according to Creswell (2002), these assumptions are known as: paradigms, epistemologies and ontologies, or what is broadly conceived as 'Research Methodology'. A research paradigm represents a set of assumptions and philosophies relating to people's perceptions about the world, and about knowledge nature (Gephart, 2004). In addition, this paradigm is concerned with the way in which research should be undertaken. So, for any research, it is essential and crucial to identify the adopted paradigm regardless what the aims or field of the research are. Because choosing a paradigm reflects on the logical sequence that connects empirical data to the study's initial questions, and ultimately to its conclusions (Orlikowski and Baroudi, 1991).

4.3.1 Research Philosophies

In order to choose a paradigm, it is necessary to decide the research philosophy, in which this philosophy is about the nature and development of knowledge (Saunders et al, 2007). There are two major branches that any research needs to take a position on in order to know and think. They are: epistemology and ontology. The following will describe each one.

Epistemology: This branch is defined as "a way of understanding and explaining how we know what we know" (Crotty, 2007, p. 8). It is concerned with what is constituted as acceptable knowledge in a discipline. This means it offers a working environment for the researchers in order to figure out the possible nature of knowledge in legitimate and adequate ways, because it recognises possibilities, scope, and common basis (Bryman, 2004).

Ontology: This branch is defined by Walliman (2006, p. 15) as "a theory of social entities and is concerned with what there exists to be investigated". In other words, it is concerned with the "What is" question and mainly focuses on the nature of social phenomena as entities (Crotty, 2007).

4.3.2 Research Paradigm (Theoretical Perspective)

In social studies, there are a number of theoretical perspectives or paradigms which are defined as "A set of shared assumptions or ways of thinking about some aspect of the world" (Oates, 2006, p. 282). In the field of IS research, there are three fundamental paradigms, namely positivist, interpretive and critical (Orlikowski and Baroudu, 1991; Stahl, 2008; Klein and Myers, 1999). The following will describe each one.

Positivist: This paradigm seeks to identify the relationships or primary patterns within the social world. Thus, it utilises scientific methods to forecast, explain, and control phenomena. Moreover, this paradigm is known as deductive study, and is recognised by its link with empirical science. Thus, Positivism paradigm aims to generate hypotheses. This is in order to examine them separating the examined stated results and the subjective value evaluation, which leads to objectively offer the explanations (Bryman, 2004) and (Benton and Craib, 2001). Therefore, due to its objectivity, it neglects all non-scientific humanistic perceptions, like conscious, feelings, and thoughts (Crotty, 2009). This means that this paradigm claims the separation between reality (i.e. phenomena) from humanistic observation (i.e. researcher) (Gortner, 1993). In addition, Playle (1995) identified a number of basic principles surrounding positivism. The first is that this paradigm asserts that facts exist before being found out. Next, the term 'Empiricism' expresses direct developed knowledge based on testing and observing such facts. Additionally, according the 'Reductionism' concept, it is possible to reduce complex social concepts into logically quantified and universal laws. Last but not least, this paradigm declares that achieving objectivity needs serious commitment to specified methodological principles.

Interpretive: Contrary to the previous paradigm, interpretivism raises the need for taking account of humanistic meaning according to people's actions and perceptions. This paradigm does not separate the researcher from the observed phenomena, so it provides a chance to subjectively explore the researcher's point of view while building facts. Actually, within this paradigm, there is a belief that the interpretation of a researcher on phenomena reflects the 'lived experience' of the researcher himself, which is considered to be an essential factor in finding the truth (Weber, 2004). As result, this paradigm aims to present the researcher's understanding in terms of the dissimilarities between people's roles as actors in the social world.

Critical: This paradigm received increasing interest over the last years (Myers and Klein, 2011). According to the philosophical perspective of this paradigm, reality in founded in a historical way in which it generated and regenerated by humans. So, the knowledge cannot be seen as separated components (Orlikowski and Baroudi, 1991). The aim of this paradigm is to investigate social matters by brining and examining the available social circumstances. In this respect, this investigation, in a way, focuses on the contradictions in the world and presents what feels wrong instead of what feels correct (Myers, 2009; Walsham, 2006). Moreover, this aspect of critical research assists the researchers to maintain the ideological impact on their studies, it terms of balancing between the interests in the people within the study, with the awareness of the influences of politics, culture, and sociality Myers (2009).

4.3.3 Justification for choosing Interpretive Paradigm

This research adopts the philosophical assumptions of 'Epistemology' as it offers "a way of understanding and explaining how we know what we know" (Crotty, 2007, p. 8). This research has an 'Exploratory' purpose, because it looks to provide an in-depth understanding of problems in the organisational practice of IS development. In addition, this research seeks to

develop theories with respect to the reasons behind IS project escalation and deal with incomplete knowledge transfer. As such, this research is positioned within the paradigm of 'Interpretivism'. The reasons behind this selecting are following.

Firstly, in this research there is neither a hypothesis testing nor statically calculating measures of variables. This means the positivist approach is not applicable here.

Secondly, this research aims to bridge the identified gap within the context of IS development literature. In this respect, adopting the interpretive paradigm will assist in achieving an effective exploration of this subject area, and in producing comprehensive understandings with respect to the relationship between the reasons and results surrounding IS project escalation and incomplete knowledge transfer. Particularly, number of IS scholars (Klein and Myers, 1999, Orlikowski and Baroudi, 1991) mentioned the significance of employing interpretive paradigm, in terms this paradigm is more suitable to contain the richness of social context which includes people's attitudes and thoughts. Furthermore, these scholars pointed out interpretive paradigm crucially aided to generate deep comprehension into phenomena with information systems studies.

Thirdly, this research aims to learn how to completely transfer the knowledge during RE process from the viewpoint of the interviewees. In this particular, employing interpretive paradigm is more appropriate because it does not separate the researcher from the subject. This means the researcher can closely interact with the subject through meeting the participants in person, listening to their feedback, and discussing their replies. As result, this leads to develop a comprehensive image which reflects participants' viewpoint regarding the subject. At the same time, this image is full-filled with useful details, like the reasons of acting in certain way, and the target wanted to achieve.

It is worth mentioning, number of IS scholars pointed out the significance of using interpretive paradigm and its critical contribution to both

practice and theory in IS field (Klein and Myers, 1999). This paradigm received more interest as the focus in IS research moved from technical development to focus on social interaction (Stahl, 2008). Moreover, Bailey (2007) mentioned researching within interpretive paradigm construct the meaning of reality by interpreting the social interaction in people's live, in terms of how they do certain things and what the purpose is. This means, within the interpretive paradigm, it is crucial to understand peoples' attitude according to the perspective of the participant, in which this perspective based on their own experience and interaction towards the phenomenon understudy (Collis and Hussey, 2009).

After adopting the suitable paradigm for this research, the next section will discuss choosing the suitable research approach.

4.4 Research Approaches

According to Saunders et al (2007), doing scientific research involves the usage of theory, which would be explicitly presented in the findings. Thus, since the beginning, the clarity of this theory's involvement raises a crucial concern regarding the design of research projects and choosing appropriate strategies accordingly, in terms of testing the theory or developing one. In this respect, Creswell (2009) identified three different types of research approach. These are as follows:

4.4.1 Deductive (Testing Theory)

This approach concerns itself with testing hypothesis and developing theories. So, it sounds quite useful in scientific research in terms is objectively testing theories through examining various variable relationships. Furthermore, the data can be assessed and analysed by statistical techniques. Thus, studies in this approach are known as **'Quantitative Research'**.

The following is from (Robson, 2002, cited in Saunders et al, 2007, p. 117), who suggests a sequence that deductive research should go through:

1. Deducing a hypothesis from the theory.
2. Expressing the hypothesis in operational terms, which proposes a relationship between two specific concepts or variables.
3. Testing this operational hypothesis.
4. Examining the specific outcome of the inquiry.
5. If necessary, modifying the theory in the light of the findings.

4.4.2 Inductive (Building Theory)

This approach mainly aims to provide a better understanding of problems or phenomena. In a way, it seeks explanations to a social problem through investigating the meaning behind concepts or behaviours of individuals or groups. Within this approach, the result of collecting and analysing data is used to develop the theory. Further, studies in this approach are known as **'Qualitative Research'**. The following demonstrates the highlighted features of the inductive approach as mentioned by Saunders et al (2007, p. 120):

1. Gaining an understanding of the meanings human attach to events.
2. A close understanding of the research context.
3. The collection of qualitative data.
4. A more flexible structure to permit changes of research emphasis as the research progresses.
5. A realisation that the researcher is part of the research process.
6. Less concerned with the need to generalise.

4.4.3 Mixed

Apparently, this approach includes features of both previously mentioned approaches. Indubitably, the reached outcome is considered to be among the finest through applying this mixed approach. It is not only the matter of collecting and analysing data of both types, but actually a combination of approaches that strengthens a study overall. Studies in this approach are known as **'Mixed Methods Research'**.

4.4.4 Justifications for choosing Qualitative Approach

The following discusses the reasons of suggesting 'Qualitative' as the most suitable approach for his research.

Firstly, as discussed previously within the literature review, this research aimed to investigate a new perspective and setting with respect to IS project escalation. This setting represents a new area to explore; one that has not been satisfactorily explored to date. Thus, qualitative is seen as the most appropriate approach for such an exploration. In this respect, number of scholars asserts employing qualitative research is evident to study any phenomenon in case very little is yet known (Robson, 2002; Corbin and Strauss, 2008), that may not easy to achieve through using quantitative techniques.

Secondly, one of the aims of this research is to investigate and learn from the process of RE, in which during this process the knowledge is transferred between the customer and IS developers, in addition to identify and understand the role of created and used object within that process. In this respect, qualitative research can affectively assists to achieve better understanding, in terms this approach is useful to find further and rich insights about the phenomenon understudy (Robson, 2002; Saunders et al, 2007).

Thirdly, as the intention of this research is focused on the impact of the customer attitude on the challenges of incomplete knowledge transfer and IS project escalation, thus qualitative research techniques effectively servers this

intention, because the design of qualitative research support to comprehend the social context in the real life of the people (Robson, 2002; Corbin and Strauss, 2008). Moreover, capturing participant's thoughts and words is a considerable method to collect the data. In this respect, as this research interested in people's attitude, using qualitative research allows the participants to freely tell their expertise and feelings. Furthermore, qualitative research supports contrasting and comparing between the various viewpoints of the participants (Myers, 2009). This point seems crucial, as this research involves two groups of people who act different roles (i.e. customer an IS developers), so using qualitative research enhances understanding the similarities and difference of their viewpoints.

According to above discussion, this research is more concerned with the way that participants perceive the truth, rather than the objectivity of this truth. Therefore, qualitative approach offers more convenient portrayal than the quantitative approach.

4.4.5 Justifiability and Transferability in Qualitative Study

One of the significant characteristics of the quantitative approach is that it attempts to disregard interpretations and subjectivity from scientific research. This approach aims to objectively analyse data, and to apply theories as common rules or trends. Quantitative approaches utilise statistical procedures and rely on the concepts of reliability and validity to achieve objectivity. Quantitative approaches also endeavour to generalisability (Hair et al, 1998).

A number of qualitative scholars argued the efficiency of quantitative approach. For example, Auerbach and Silverstein (2003) claimed these statistical concepts are only achieved in an "ideal situation", in which this situation does not necessary found in practice. Further to their claim, the challenge associated with the concepts of reliability and validity refers to the notion of "pursuing the unreachable ideal" in which

> "The phrase is intended to express the idea that developing a first valid scale requires comparing it with another valid scale, and that this second valid scale

> must have been developed by comparing it with a third already valid scale, and so on to infinity" (p. 80).

Moreover, the same notion applies for the concept of generalizability, in terms of the accuracy of choosing the right "representative sample" of the research population. So, checking this accuracy needs comparing between the results of a study with a second study that has another bigger sample. Even in case of reaching similar results, the matter of choosing the right "representative sample" remains standing. Because there are numerous and various groups and settings within a population, so this involves checking the result with a third study and so on.

Therefore, due to this notion, Auerbach and Silverstein (2003) suggest a researcher should be "sceptical" about the concepts of reliability, validity, and generalizability in the social sciences. At the same time, they pointed out the qualitative approach has alternatives in which they called "Justifiability" and "Transferability". The explanation of these two terms is coming next.

Justifiability refers to that it is necessary for a qualitative researcher to analyse the data in an own subjectively way. In this respect, the researcher should consider participants' perspectives, and avoid forcing his personal subjectivity in case it is not originally founded within the data. Moreover, through using three criteria, namely transparency, communicability, and coherence, it is possible to judge whether or not it is a justifiable interpretation. The following explains each one of these criteria. First, Transparency refers to ability of other scholars and reviewers to track all the steps followed that led to the results in a research. Second, Communicability considers with the extent of clarity that the identified themes and constructs are. So, the much these themes and constructs are understood and can be explained, reflects level of communicability the interpretation has. It is worth mentioning, achieving the criteria of transparency and communicability does not require total agreement from other scholars or reviewers. Actually these two criteria concern, in a reasonable manners, with clarity of the used way to arrive to the results, and with simplicity to comprehend the themes and constructs. Third, Coherence means when sorting together all the constructs and themes, they should report a

coherent story (i.e. narrative). For sure, this coherent story does not resemble the only possible one, however it assists to rationally shape the data (Auerbach and Silverstein ,2003).

Transferability is the suggested alternative to concept of generalizability. Transferability considers two aspects with respect to research's results, namely "extending beyond your sample" and "respecting cultural diversity" (Auerbach and Silverstein ,2003, p. 87). According to Transferability concept, the identified constructs in a study are transferable if they guide the analysis in a new study with new sample. So, the researcher may expect similar abstract outlines to be identified during the analysis. At the same time, the deep specification of the themes in the new study may diverge according to the samples' culture. Finally in this respect, Orlikowski and Baroudi, (1991, p. 5) mentioned

> "Generalisation from the setting … to a population is not sought; rather, the intent is to understand the deeper structure of a phenomenon, which it is believed can then be used to inform other settings".

To sum up, though qualitative approach does not support objectivity in terms of employing statistical concepts of reliability, validity, and generalizability, number of qualitative scholars claim this approach has significant alternatives like "Justifiability" and "Transferability". Moreover, these alternatives suit the subjectivity nature of qualitative approaches.

The next section discusses choosing the appropriate strategy for this research.

4.5 Research Strategy

Crotty (1998, p. 3) defined research strategy as

> "Plan of action, processes or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes".

Selecting the research strategy depends on a number of factors, for instance, the nature of the investigated phenomena, the relationship between theories and scientific research, the philosophical point of view and its adopted assumptions (i.e. Epistemological or Ontological), and researchers' beliefs and expertise (Teresa and William, 1997). Moreover, Saunders et al (2007) have suggested a number of qualitative research strategies, for instance Experiment, Survey, Case study, Action research, Grounded theory, Ethnography, and General Inductive. The following will describe some of them.

4.5.1 Case Study

Saunders et al, (2007, p. 139) defines this as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence". It is also called 'field-work'. This strategy focuses on creating phenomena (e.g. Social unit, Community, Group, Individuals) within place and time boundaries. In addition, it uses in-depth analysis to provide intensive descriptions regarding the researched phenomena. In addition, this strategy can be combined with other types of qualitative methodologies (Creswell 1998).

4.5.2 General Inductive

According to Thomas (2006), this strategy is one of the most evident when it comes to qualitative analysis. Its main aim is to let findings emerge according to guided themes which are originally derived from raw data. Additionally, this strategy should be guided by the overarching objectives of a study and should follow a clear systematic process. This strategy is introduced for number of purposes: firstly, to reduce a huge amount of data into a short format (e.g. summary), secondly, to figure out clear relationships between the data, and thirdly, to create a model or to introduce a theory with respect to emerging concepts in the data. This strategy also aims to support understanding by creating abbreviated themes from a complex and large raw data set. Additionally, in terms of general characteristics, this strategy looks like other described qualitative techniques, so applying general.

4.5.3 Ethnography

Originally, Ethnography was used to find out the roles and structure to behavioural patterns of a research sample, through investigating humanistic culture and society, and by emphasising their attitude, beliefs, and values. So, this strategy is considered as a way to interpret a social group, system, or culture. Usually, the researcher is directly involved in the organisation's daily life, in order to observe and interview the organisation's members, and to figure out what motivates them in terms of theoretical factors and behavioural patterns (Creswell 1998).

4.5.4 Grounded theory

Grounded theory is considered as one of the popular approaches within the field of research. According to Charmaz (2006) it was first introduced by Barney Glaser and Anselm Strauss (1967). Then, in 1990 these two authors divided and each continued with separate scholarly interests.

In general, grounded theory is an organised way to set a theory, as it outlines the social events which are concluded through analysing qualitative data. Moreover, it is a group of processes which aim to present conceptual themes by analysing data in a specific manner. Thus, it has an interpretive nature because it is derived from the meanings of qualitative data (Birks and Mills, 2011). Furthermore, as a methodology, it guarantees that research outcomes are accurate and specific to qualitative data (Rhine, 2009). Additionally, the aim of grounded theory is to be aware of what is happening rather than trying to fit into present theories (Strauss and Corbin, 1990). Also,

> "The purpose of grounded theory is not to make truth statements about reality, but, rather, to elicit fresh understandings about patterned relationships between social actors and how these relationships and interactions actively construct reality" (Suddaby, 2006, p. 636).

4.5.5 Justifications for Choosing General Inductive Strategy

The following discusses the reasons of choosing ‘General Inductive’ as an adopted strategy for this research.

Firstly, number of scholars claim General Indicative is one of the common and evident utilised strategies in qualitative studies (Bryman and Burgess, 1994; Dey, 1993). Moreover, numerous of social science researches broadly employed this strategy in an evolutionary matter (Thomas, 2006). So, this present the far extend of credibility the strategy of general inductive has, in addition to its significant conveniently when it comes to undertake an investigation in social science in general, and in IS field in particular.

Secondly, as clarified earlier, this research will gather qualitative data. It is expected to achieve a huge amount of data, as the number of participant is assumed to reach 40 people who have various opinions and different perceptions. In this respect, using General Indicative strategy assists to control and extract the meaning from this complex set of data. In this respect, this strategy applies number of procedures to produce summary (i.e. number of themes) that describe the main characteristics of a raw data (Bryman and Burgess, 1994).

Thirdly, it is common to utilise the techniques of General Indicative strategy in various types of qualitative data analysis (Strauss and Corbin, 1998). In a mutual way, General Indicative strategy allows the involvement of other analytic techniques from other strategy (Thomas, 2006). In this respect, as this research intended to figure out the relation between the actors, incomplete knowledge transfer, and IS project escalation, thus there is a need adopted number of coding techniques from the strategy of Grounded Theory which aid to identify these relations.

It is worth mentioning that this research originally set out to adopt the strategy of ethnography, in which the author engages in the daily lives of IS developers in their workplace, to observe and interact directly with the

participants directly in the social community. In order to prepare for this, the author made contacts with five major IS development organisations in Saudi Arabia. However, none of the organisations agreed to host the study. As such, the author was unable to obtain formal acceptance to carry out a field study in a specific organisation. Thus, for this reason, in addition to above discussion, General Indicative presented itself as a competitive and significant alternative.

4.6 Research Design (Methods)

Research design or (methods) concern with the proposed techniques and procedures to gather data. In this respect, Myers and Avison (2002,p.7) defined research method as

> "A strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection".

The following sub-sections discuss in detail the used tool and the applied plan to collect the data, in addition to the employed analysis techniques.

4.6.1 Data Collection Tool

There are number of tools to collect qualitative data, for example Interviews, Observation, and Observation. The following describe each of them.

4.6.1.1 Interviews

Gephart (2004) defined Interviews as "situated, face-to-face interactions in which researchers typically pose question that respondents answer" (p. 458). Some of the most useful research in the social sciences is gained from qualitative methods and from people's conversations and their casual talking. During formal interviews, empathy should be established between the researcher and the interviewee in order to gain trust. The researcher should also show no bias. There are three types of interview as follows.

(1) Structured Interviews

This type is used to collect quantitative or statistical data (i.e. "Quantitative Research Interviews"). So, the researcher asks identified questions in a way that will not affect interviewees' answers in terms of researcher bias. Moreover, this type of method is helpful in descriptive studies in that it recognises general patterns. In addition, it employs statistical techniques which are useful with respect to explanatory studies. Doing this type of interview requires asking closed questions, then waiting for interviewees to pick from set answers, so it is like ticking boxes on a questionnaire (Saunders et al 2007).

(2) Semi-Structured Interviews

By conducting this type of interview, the researcher asks questions from a pre-set list. However, these questions may vary depending on the progress of each interview. This means it is possible to add, remove, or change the order of the questions. It is highly recommended for the researcher to record the interview. Thus this type of interviewing seems quite useful in exploratory researches (Saunders et al 2007).

(3) Unstructured Interviews

In order to find new insights and outline what is happening, this type of interview is used in exploratory research. This is an informal method in that researchers do not have pre-set lists of questions. However they often have clear ideas about what themes they will stick to. As such, interviewees have more freedom to describe their feelings regarding a particular subject, concept or event (Saunders et al 2007).

4.6.1.2 Focus Group

According to Bryman (2004), a Focus group is "a form of group interview in which there are several participants (in addition to the moderator/facilitator); there is an emphasis in questioning on a particular fairly tightly defined topic; and the accent is upon interaction within the group and

the joint construction of meaning" (p. 346). It can be used to introduce adequate information about the subject as a pre-research method; therefore it seems helpful in operationalisation, and in avoiding significant errors (Sarantakos, 2004).

4.6.1.3 Observation

Observation is considered one of the oldest applied methods in investigation, as the first knowledge in the world was obtained through observation (Cauvery, 2003). Such a strategy involves recording, depicting, systematic observation, and analysis. Hence, it is efficient when it comes to studying and interpreting human behaviour. There are number of observation types. Firstly, there is Participant Observation, in which the researcher interacts with the study group. This allows the sharing and feeling of experience. Secondly, there is Non-Participant Observation. Here, the researcher does not actively become part of the situation and is only there to observe. It is recommended that a series of observations are conducted in the same settings in order to gain consistency and reliability and reduce the effects of researcher bias. Thirdly, there is Non-Controlled Observation, where observation happens in a natural environment with no influence by any external factor. Fourthly, Controlled Observation is used to test any bias resulted externally by misleading perception or inaccurate data. Finally, there are Field Observation Studies. Here, the researcher should take care with respect to the approval of the targeted organisation. Research collected via this method is often bound by people, time, and location. Also, particularly when observing a complex phenomenon, researchers to be very careful with respect to all influencing factors (Cauvery, 2003; Gill and Johnson, 2002).

4.6.1.4 Justification of using Semi-Structured Interviewing Tool

A semi-structured interviewing tool is employed as main and only source of data. This tool is broadly and evidently used in IS studies (Schultze and Avital, 2011). According to Bryman (2004), interviewing should be more flexible and less structured in order to fit with qualitative purposes. Thus, new

questions may be introduced, depending on replies. Choosing this tool is decided because of the following.

Firstly, semi-structured interviewing allows the researcher to dig deeper into participant's replies, and investigate these replies in more depth to find out new insights. At the same time, the researcher is free to hint the participant with number of possible answers (Gephart, 2004). Thus, this presents the ability of semi-structured interviewing to maintain the balance between the very formal and informal conversation approach (Myers, 2009).

Secondly, in qualitative research, semi-structured interviewing is the most widely applied and one of the most crucial data gathering tools in general, moreover, this tool is broadly employed in numerous studies exploring IS project investigation (Myers and Newman, 2007).

Thirdly, this research has an interpretive nature. So, using semi-structured interviewing tool support reaching the participant's viewpoints and perceptions with regards to the interests of this research. In this respect, this tool is significant when it comes to figure peoples' rationales and the reason behind specific matter (Myre, 2009).

4.6.2 Data Collection Plan

In this research, the data is collected on two stages as follows:

4.6.2.1 The First Stage of Data Collection

In this stage, a number of semi-structured interviews with 30 IS project managers are conducted. The purpose of this stage was to explore the participants' expertise and perceptions regarding the issue of IS project escalation and how to deal with it. Participants' recommendations for practice were also explored, with respect to transferring customers' knowledge, and how to deal with the issue of unclear ideas. Choosing IS project managers in this stage was down to the author's own professional experience (the author has previously held an IS project manager position and a position as an ISO

auditor). Thus, the author is aware that project managers have specific expertise, knowledge and experience relating to project operation, status and challenges. This is because project managers lead IS develops and represent organisations when communicating with customers and reporting progress and challenges to higher management. Therefore, it seems that the project manager has more credibility when it comes to discussing project challenges. Table 4.4 provides information about participants' numbers and their organisations.

Table 4.4: Details and number of interviewees from each organisation of the first stage of data collection

	Organisation	**Number of Interviewees**
1	D.L.: This company used to be a government unit which successfully passed through the privatization process. Its I.T. department was considered to be a big one, with about 800 IS specialists working in software development. In the past, this organisation used to provide Business-to-Business services. Later, after privatization, it served customers from outside the organisation.	18
2	K.U.: This is a government and educational organisation. There are about 40,000 students in 20 colleges in various specialties (e.g. Medicine, Engineering, Science, Art). There are about 200 staff who work in the deanship of Information Technology. Furthermore, there are number of departments, where each department focuses on specifically related I.T. fields (e.g. Internet website, Databases, Software Development). Moreover, the software development department serves the organisation internally, where the customer are from its various colleges and centres.	6
3	N.B.: This company originally operated in the banking business. In addition, the I.T. department was improved by being hived off as a separate unit in order to follow the modern sense of business, and to maintain the huge migration to computer and internet applications. The I.T. department serves the bank internally (Business to Business) and customers who need financial solutions such as electronic payment and advanced accounting systems (Business to Customer)	2
4	Z.F.: This is a private company which provides software development services to different types of businesses and customers.	2
5	B.L.: This is a private company which provides software development services to different type of businesses and customers.	2

Source: Developed by the author

Data collection was carried out towards the end of 2010 and took three months. In total, the first stage conducted interviews with 30 IS project managers from five different organisations. All interviews lasted an average of 60 minutes.

The participants are Saudi men aged between 25 and 58 years. Some of them have worked in the field of IS development for more than 20 years, as they have previously worked in other organisations. The majority of them started working in the profession as developers, and then they subsequently were promoted to IS project managers as a result of seniority and experience.

It should be noted that in order to maintain the ethical protocol employed in this research, no further details about the participants can be revealed.

4.6.2.2 The Second Stage of Data Collection

In this stage, a number of semi-structured interviews with 10 customers are conducted. This stage presented an opportunity to address comments and feedback relating to customers' viewpoints with respect to the issues of 'unclear ideas' or 'project escalation'. This seems an effective method in that it ensures fairness for both parties (principal and agent). Additionally, based on customers' perceptions, it is possible to verify the influence diagram or the knowledge transfer process model which would be developed during the analysis. Thus, it will strengthen the findings through applying data triangulation in the research.

Data was collected in the middle of 2012 and took one month. In total, the second stage conducted interviews with 10 customers. Interviews lasted an average of 50 minutes. Table 4.5 provides more detail about the number of interviewees according to each customer's organisation.

Table 4.5: Details and number of interviewees from each organisation of the second stage of data collection

	Organisation	Field of Practice	Interviewees' Job Title	Number of Interviewees
1	**O.L.**	Vehicles' maintenance	- Branch Manager - Customer Relationships Assistance	2
2	**M.C.**	Medical Services	- Human Resource Manager	1
3	**J.B.**	Banking	- Branch Senior Manager - Head of IT department	2
4	**M.K.**	Real Estate	- Branch Manager	1
5	**T.T.**	Tourism	- Sales Manager	2
6	**C.A.**	Governmental Services	- IT Specialist	1
7	**S.C.**	Construction	- IT Specialist	1

Source: Developed by the author

4.6.2.3 Choosing the Country of Empirical Research

The empirical part of the research and data collection took place in Saudi Arabia. This country has a huge market for IS development in terms of the investment size which is estimated to reach 8.6 billion US dollars by nowadays in 2013 (AlRiyadh, 2011). This reflects the importance of the revival that Saudi Arabia is witnessing in IS development field. At same time, according to the literature, the risk in this field is growing in parallel with investment. This presents Saudi Arabia as an interesting setting in which to study IS project escalation.

Additionally, as far as the author is aware, there is a lack in research about Saudi Arabia in the particular area of IS project escalation. Therefore, this research may better serve career development, and open gates to further research opportunities in the same field at this country.

4.6.2.4 Sampling Techniques

In order to access the targeted sample, the author, who has experience working in IT departments in Saudi organisations, relied on his colleagues profession's to access participants. Convenience and Snowball sampling techniques were used, where "Convenience sampling means recruiting whomever you have access to" and "Snowball sampling means starting with a convenience sample of a few research participants and asking them to select others" (Auerbach and Silverstein, 2003, p.18).

As mentioned earlier in section 4.5.5, the author was unable to obtain formal acceptance to undertake the field study on an organisational level. Therefore, using Convenience and Snowball sampling techniques was a competitive alternative, particularly this techniques allows obtaining a formal acceptance on a personal level.

4.6.2.5 Ethical Considerations

In social research, the consideration of ethical issues and anonymity represents a crucial matter, and mishandling this consideration can lead to critical unfortunate impacts (Tilley and Woodthorpe, 2011). Therefore, the participants have the right to comprehend the process and nature of data collection, in addition to the right of privacy and anonymity to avoid any possible harm. In this respect, the researcher is responsible to inform the participants with these rights. Consequently, for a participant, it is necessary to submit an informed consent to confirm the acceptance to participate, and to acknowledge the awareness of the freedom to reject the involvement at any time (Payne and Payne, 2004, Tilley and Woodthorpe, 2011). The following Table 4.6 shows a number of general ethical issues that presents through undertaking the research.

Table 4.6: A Number of General Ethical Issues in a Research

	Description
1	Privacy of possible and actual participants
2	Voluntary nature of participant and the right to withdraw partially or completely from the process
3	Consent and possible deception of participants
4	Maintain of confidentiality of data provided by individual or identifiable participants and their anonymity
5	Reactions of participants to the way in which you seek to collect data, including embarrassment, stress, discomfort, pain and harm
6	Effects on participants of the way in which you seek to use, analyse and report your data, in particular the avoidance of embarrassment, stress, discomfort, pain and harm
7	Behaviour and objectivity of you as a researcher

Source: Adopted from (Saunders et al, 2007, p. 181)

This research took into account the ethical consideration as discussed above. First, the author ensured to verbally explain the purpose of this research, and what the participation involves, to each one of the participant in person.

Second, in order to gain more credibility, the author presented a letter, which printed on the Nottingham University's formal paper and signed by the supervisor, to each one of the participant. This letter is sent from the supervisor to 'Whom It May Concern'. In addition, this letter confirms the situation of the author in terms of the university he is studying at, the PhD programme he is attending, and the research project he is undertaking.

Third, the author ensured to inform each one of the participants they have the right not to answer any question, or even to completely terminate the involvement. That is to avoid creating any pressure or unpleasant feeling.

Fourth, during each interview, the author ensured to respect the participant's opinions, and to avoid commenting in a way it does not serve the scientific purpose of the research. In addition, the author ensured to commit to social manners, cultural and religious constitutions in Saudi Arabia.

Fifth, the author ensured each participant signed an informed consent form presenting their participation to be voluntary according to their will. The

informed consent form declared the purpose of this research, and explained what the participation involves as well (see appendix I).

Sixth, the anonymity of participants and their workplaces was maintained throughout all the stages of this research. In this respect, a pseudonym is used to refer to the participant, in which this pseudonym included a description to the sample group (i.e. customer or project manager) with numbers. For example customer 10 and PM 20. The organisations or workplaces of the participants are referred using random initials, in which these initials neither inform not hint about the identity of the real organisations, for example (D.L.) and (K.U.).

Seventh, only one single softcopy of interviews' transcription is encrypted and saved in a digital storage unit (i.e. USB memory-stick). This digital storage unit is isolated and kept, with the singed consent forms, in a safe the at the author's residents in Saudi Arabia.

Following this procedure allowed the participant to be free and open to tell about their own experience and perceptions.

4.6.2.6 Setting Interviews Questions

Interview questions were set by the author, then revised and re-structured in a more coherent way by the project supervisors. The author also consulted two Saudi IS project managers, who between them have more than 20 years of experience in the field, in order to rephrase the questions from academic terms into a language more understandable to the targeted sample.

However, after conducting the first two interviews, the author noticed that the two IS project managers were mainly talking about incomplete knowledge transfer as the solely reason behind IS project escalation. The author suspected that this was due to the inadvertent leading nature of some of the questions used in the interview and possibly some unintentional hinting about the core research subject (i.e. incomplete knowledge transfer). In order to control for this issue, the interview questions were subjected to another

refining phase and were rewritten in a more open-ended style. In addition, the author shortened the introduction at each interview and generally described the research objective.

It is worth mentioning, the author ensured the interviewees were aware of the concept of project escalation by asking them to define it first, and then by comprehensively explain this concept to them.

In general, the interview questions, in the first stage of data collection, were divided into a number of sections. One section was introductory, and covered the organisation and project manager profiles and a general discussion of the usual challenges of IS development practice. Additionally, other sections focused on the interaction and communication between customers and developers, particularly during the RE phase, in terms of the issues expected to arise, and the artefacts to be used (e.g. tools, methods, documents, drawings). This was all in addition to their characteristics and functions. A later section discussed the issue of project escalation, the reasons behind it, how to detect it and how to deal with it.

The interviews generally included the questions in Table 4.7. Questions 3, 4, 5, and 6 addressed the first research aim, and questions 2, 4, and 5 addressed the second research aim.

Table 4.7: Questions used in the Semi-Structured Interviews in the First Stage of Data Collection

	Individual Interview
1	Tell me about yourself and about your organisation. Based on your experience, tell me about the project manager's duties.
2	How do you usually start an IS development project? What are the phases of such a project? Tell me about your routine when working in a project. Tell me in detail. What knowledge about the project is most important to you (i.e. critical for success)? Why do think that?
3	Did you face any problems or troubles during working in IS development projects? Generally, if any, what kind of problems do you face during project operation? Tell me in detail anything you feel: it may negatively impact on project performance and progress (i.e. reasons, people)
4	Tell me about your customers. How do you describe them? How usually do you interaction with them? What do you think is important to make effective relation and communication with the customers? Generally, if any, what challenges do you think you may face from customer side? How do you deal with them?
5	At what phase of the project do you gather customer's requirements? What do you do during that phase? Tell me in detail what is the expected outcome of each phase, and how do you use it later? From your experience, what do you think is the best and effective way to get all the customer's ideas? What tools or methods do you recommend? Why? Tell me more please. How do you make sure that you got all the requirements completely? What are the impacts of having clear customer's requirements? Generally, if any, how do you detect and problems with the gathered requirements? How do you deal with them? Generally, if any, did you face a situation where you think there was a problem with customer's requirements? What do you think happened? And what do you think was the impact on the project? In your opinion, who should take the responsibility to make sure the customer's requirements are transferred accurately?
6	Have you heard about "IS Project Escalation"? Tell me what it is according to your understanding. Well, actually it defined as: … , is this definition clear, should I explain more? Generally, if any, have you experienced or knew about a situation of project escalation? What do you think happened? According to your experience as a project manager, what do you think the reasons behind project escalation are? How it happens? How to detect it? How do you think it is possible to prevent project escalation in the first place? Generally, were there any other parties involved in this situation? What did they do? Tell me in more details. As a project manager, what do you recommend to do in order to deal with a situation of project escalation?
7	Can you tell me anything else?

Source: Developed by the author

Regarding the second stage of data collection, the interview questions were generally divided into number of sections. One section was introductory, which covered the organisation and interviewee's profile. Other sections focused on the communication with the developers, particularly during the RE phase, in addition to any possible challenges. A later section discussed the issue of project escalation in terms of whether or not the customer experienced such a situation, and what his reaction was. It is worth mentioning that customers were given a chance to provide an opinion on what project managers mentioned about customer responsibilities with respect to IS project escalation and incomplete knowledge transfer. In general, interviews included the questions in Table 4.8. Questions 2, 3, 4, 5, 8, and 9 addressed the first research aim, and the questions 4, 5, and 6 addressed the second research aim.

Table 4.8: Questions used in the Semi-Structured Interviews of the Second Stage of Data Collection

	Individual Interview
1	Tell me about your practice and business.
2	Did you deal with a computer programming company before? I mean did you hire them to develop a program for your company? Tell me about this computer program you needed. Tell me about your experience with these people.
3	Generally, if any, did you face any problem during that project (i.e. challenges, people)? And how did you solve these problems?
4	How did you tell these people about you requirements? Tell me in detail. Did you feel that they got all your ideas and requirements completely? Why do think that? In case it happened, what was the impact of not understanding your requirements on the project?
5	Generally, if any, why do you think the programmers did not understand your ideas? And how did you discover that? What was the impact on the project from you viewpoint?
6	From your experience, what was the best way to tell your ideas to the programmers? Like (Meeting, Workshop, and Drawing Sketches)?
7	During my study, I found that the customer is responsible in more than way for unclear ideas and requirements like (Customer is unable to clarify his Ideas, Lack of Commitment and Communication, Multi-Knowledge Sources, keep adding on-going requirements), What do you think? How do you comment or refute that?
8	Have you heard about "IS Project Escalation"? Tell me what it is according to your understanding. Well, actually it defined as: … , is this definition clear, should I explain more? Do you think your project with the programming company has escalated in a way or another? Why do you think this happened? (i.e. reasons, people)
9	What was your reaction at that time? How did you deal with that situation?
10	During my study, I found that the customer is one of the people responsible for project escalation, like (The Customer has hidden agenda beyond project success, or he suffers Lack of awareness in terms of developing and using IS products, or the customer keep changing project's scope) What do you think? How do you comment or refute that?
11	Can you tell me anything else?

Source: Developed by the author

4.6.2.7 Addressing the Theoretical Components of the Suggested Enhanced Framework to Address the First Research Aim

Referring to Tables 4.7 and 4.8 regards the used questions sets in the semi-structured interviews during the two stages of data collection, the following Tables 4.9 and 4.10 clarifies the used questions to addresses the theoretical components in the Enhanced Framework to Address the First Research Aim in Figure 4.4.

Table 4.9: Questions Address the Theoretical Components in the Enhanced Framework during the First Stage of Data Collection

Variable	**Relation with**	**Question set number(s)**
Customer	Knowledge Transfer	5
	Project Management	4
Developers	Knowledge Transfer	5
	Project Management	3, 6
Project Manager	Knowledge Transfer	5
	Project Management	1, 2, 3
IS Higher Management	Knowledge Transfer	5
	Project Management	3, 6
Other Parties	Knowledge Transfer	5
	Project Management	3, 6
Knowledge Transfer	Project Management	5
Knowledge Transfer	Project Outcomes	2, 5
Project Management	Project Outcomes	3, 6

Source: Developed by the author

Table 4.10: Questions Address the Theoretical Components in the Enhanced Framework during the Second Stage of Data Collection

Variable	**Relation with**	**Question set number(s)**
Customer	Knowledge Transfer	4, 5, 6
	Project Management	2, 3
Developers	Knowledge Transfer	4, 5, 7
	Project Management	2, 3, 8
Project Manager	Knowledge Transfer	4, 5
	Project Management	2, 3, 8
IS Higher Management	Knowledge Transfer	3, 5
	Project Management	3, 8
Other Parties	Knowledge Transfer	3, 8
	Project Management	3, 5
Knowledge Transfer	Project Management	4, 5
Knowledge Transfer	Project Outcomes	4, 5
Project Management	Project Outcomes	3, 4

Source: Developed by the author

4.7 Qualitative Data Analysis

There are various forms of qualitative data. These include written forms (e.g. organisational documents, reports, interview transcripts, newspapers, and field notes), and non-written forms (e.g. images, videos, and audio recordings) (Saunders et al, 2007). The next step after (or sometimes during) gathering data is to analyse it. According to Grbich (2007), analysis is an on-going process which involves tracking and checking to find data outcomes by focusing on challenges and recognising where there is a need for further investigation. This is general good practice and allows the researcher to create broad views of the data which can later be segmented. Such a process transforms the data into a form of explanation, understanding, or interpretation with respect to humanistic behaviour. In addition, this analysis aims to test and create meaning from the qualitative content. The following will discuss the used techniques in this research.

4.7.1 Thematic Analysis

According to Creswell (2002) and Thomas (2006), the process usually starts by cleaning and preparing the data content (i.e. transcribing into text files). The next step involves skimming the text with the aim of recognising all possible ideas and themes. Then, it is time to set the general categories or constructs, which may be guided by the intentions of the research. In addition, sub-categories or themes can be distinguished by reading the text more than once. Furthermore, it is possible to set the themes based on exact phrases or the meanings of some parts of the text. Later, the researcher should carry out an overlapping coding process, where some parts of the text are allocated to more than one category. In addition, the researcher should consider the non-coded text. Therefore, these pieces of text should be assigned to one category or removed. The last step is to keep revising and enhancing the category system, by selecting more accurate and relevant ones, merging or separating categories, and choosing more suitable quotations that fit with themes or category ideas. The following Table 4.11 clarifies this process.

Table 4.11: Identifying Themes Process

Initial reading of text data	Identify specific text segments related to objectives	Label the segments of text to create categories	Reduce overlap and redundancy among the categories	Create a model incorporating most important categories
→			→	
Many pages of text	Many segments of text	30 to 40 categories	15 to 20 categories	3 to 8 categories

Source: Adopted from Thomas (2006, p 242)

Thematic Analysis was followed in this research. As an inductive study, this was helpful with regard to clarifying meanings by summarising a huge amount of data, particularly this research collected a complex set of data that contains various toughs and perceptions of different 40 participants. Thus, identifying the themes from the raw data allowed recognizing the important aspects in the data (Thomas, 2006).

4.7.2 Coding Techniques

A number of techniques are used to code data, in which these techniques are adopted form the strategy of Grounded Theory. However, it is confusing that there are a number of terms used to address the ways of coding in grounded theory in particular, and in other qualitative strategies in general (Birks and Mills, 2011). In general, the process starts with Initial Coding or Open Coding, in which crucial words are distinguished and then categorised accordingly. These categories act as theoretical themes, where the analysis reveals codes that lie beneath these themes. Moreover, these themes are described based on their meanings and properties. Next, there is Axial Coding, which focuses on the relationship between themes and sub-themes and regroups the coded data to set it in a more coherent way. After that, there is Theoretical Coding or Selective Coding, which introduces a sophisticated degree of coding in that it emphasises "how the substantive codes may relate to each other as hypotheses to be integrated into a theory" (Glaser, 1978, p 72). Thus, this coding system assists in developing a logical and analytical story (Charmaz 2006; Strauss and Corbin, 1998; Auerbach and Silverstein, 2003).

These coding techniques assist in identifying the relationship between the different aspects in the data (i.e. themes). As such, selecting and executing these techniques appropriately was crucial in this research. In this respect, this research aimed to figure out the relations and impacts between numbers of theoretical components (i.e. customer, incomplete knowledge transfer, IS project escalation). So, Initial Coding and Axial Coding used in the first round of analysis to identify the main themes (i.e. constructs) and their sub-theme, in which these themes represents the mentioned theoretical components. Then, in the next round of data analysis, comes the Theoretical Coding in order to find the relations and links between these themes or the theoretical components.

4.7.3 Narrative Analysis

This method of analysis summarises the data and then links research objectives interviewees' responses. So, it presents their subjective experience in terms of their viewpoints of the suggested constructs and themes (Auerbach and Silverstein, 2003). Furthermore, Grbich (2007) suggests that there are two main types of narrative: 'Socio-linguistics', which in concerned with conveyed meaning and 'Socio-cultural', which investigates the framework of people's responses in a particular incident.

This type of analysis is used in this study, as it is the commonly the next step after completing the Thematic Analysis (Auerbach and Silverstein, 2003). That is in order to coherently link and explain the identified themes in deeper details.

4.7.4 Content Analysis

This type of analysis follows a systematic procedure to code and classify the contents of huge chunks of textual data. It is often applied when it comes to analysing interview transcripts in social science studies. It is also used with other types of written form data, like organisational documents, reports, and field notes. Using content analysis requires pre-set ideas relating to the data about to be analysed in terms of aspects, approach, size and

relationships (Grbich 2007). Moreover, there are two approaches within this type of analysis. The first of these approaches is 'Enumerative', and is concerned with word counts, rankings, and keywords in the context. This approach is considered fairly quantitative. The second is 'Thematic', where the data set is imposed by a coding frame which is created according to prior data analysis or theory. As result, this will help identify the reason for using words in such a way (Grbich 2007). This approach is qualitative, and it has been used in this research.

Using Content Analysis was so convenient in this research, particularly when processing the data of the first stage of data collection. In that stage, a number of interviews is conducted with 30 IS project managers. Thus, this big number effectively allows running comparative and quantifying methods on the data. This helped to figure out the differences between the viewpoints of the participants and categorized them accordingly. In addition, the number of themes according to themes' frequency was prioritised. In such, this analysis enriched and strengthened the findings.

4.7.5 Data Displays Analysis

According to Miles and Huberman (1994, p. 8), data display is "an organised, compressed assembly of information that permits conclusion drawing and action". Using data display helps to transform huge data sets into more manageable formats. Williamson and Long (2005) suggest that there are a number of shapes for data display, for instance text-extending, chart, metric, network, matrix, and graphs. Furthermore, it can take basic forms like checklist matrices, or it can take more complex forms like chronological time-order matrices. In complex cases where there are numerous variables affecting each other, more advanced forms of data display called 'Influence Diagram' can be used. Each one of these styles is useful in that they aid the analysis process and help build theories according to each style's functionalities. Therefore, it aids the development of theoretical propositions. Also, developing a data display creates a chain of logical evidence, which is significant in terms of disputing the existing criticism that insufficient details result from analysis due to using

qualitative methods. Moreover, it presents the research process transparently. Employing data display seems quite useful. However, it is crucial to be cautious when using data display in research, especially when deciding how much detail should be presented, as it may be risky to oversimplify the subject. Furthermore, developing such a form to display the data may be a time consuming process because it requires a number of trial and error attempts (Williamson and Long, 2005).

Once again, due to the huge amount of the collected data in this research, using Data Displays Analysis was quite useful. In terms, this analysis simplified the complexity in the raw data, and represented the aspects in the data in clear and understandable way. Particularly when drawing an influence diagram that presents the relations between the theoretical components.

4.7.6 Analysis Plan

This research generally used the above mentioned Qualitative data analysis techniques. The analysis process started with the transcribing of interviews. This helped to clean and prepare the data content, ready for analysis. So, the recorded interview sessions were played back from the tapes and transcribed using the computer by typing on the keyboard. It is worth mentioning, the author achieved this task by himself. In this respect, transcribing process was completed and took about seven weeks with respect to the interviews of the first stage of data collection, and took three weeks with respect to the interviews of the second stage of data collection.

Regards the raw data in both data collection stages, the first round of the analysis used Initial Coding and Axial Coding techniques to summarise and identify the main constructs and themes in the data. Then, narratives are generated through explaining the identified constructs and sub-themes.

The second round of the analysis used the outcomes of the previous round, in terms of the identified constructs and themes, and applied Theoretical Coding technique to identify the various relations between these constructs and themes. In addition, as there are a large number of participants from the first

stage of data collection, then this round of analysis used the constructs and themes from that stage, and applied Comparative and Quantifying techniques. Accordingly, this assisted to prioritise and distinguish the contrasts with respect to participants' viewpoints. During this round of data analysis, a number of data display techniques is used. In this respect, two influence diagrams which visualised the relations between the actors and the reasons behind IS project escalation and incomplete knowledge transfer are created. One diagrams represented the viewpoint of IS project manager, and the other one represented the viewpoint of the customers.

Then, the third round of data analysis focused on the process of knowledge transfer. Thus, the related themes and narratives from the first round of data analysis used to develop a theoretical framework to address the mentioned focus. Later, a process model to describe transferring the knowledge between the customer and the developers is created.

It is worth mentioning, during analysis process, two computers' software were used. The first is word-processing software (i.e. Microsoft Office Word 2010) which is used throughout the interviews' transcribing process. The second is a database management software (i.e. Microsoft Office Access 2010), which is used to aid in numerous ways throughout the analysing process (e.g. codifying the text, quantifying the themes, linking quotes, sorting similar ideas). In this regard it was not possible to use "Nvivo", which is specialised software to assist in qualitative analysis, due to the lack of supporting Arabic text, in which Arabic is the used language throughout conducting all the interviews. In this respect, the Arabic script is translated into English text later when writing the report of data analysis.

4.8 Conclusion

This chapter discussed research philosophy and presented a detailed design of the research process and stages. At the beginning, the suggested conceptual framework of the research has been developed. This was followed by developing an enhanced framework to address the first research's aim. Next, the selected research methodology and methods were considered with detailed justifications. Then there was a description with respect to research design in terms of the data collection stages, target sample, and setting interviews' questions. Finally, the proposed analysis strategy was identified.

The next chapter will analyse the data of the first stage of data collection. In which this data considered the IS project manager's perceptions toward the topics of knowledge transfer and project escalation in IS development projects.

Chapter 5: The Analysis of the First Stage of Data Collection

5.1 Introduction

In the previous chapter, the conceptual framework of this research was developed. Then the methodology and research design were discussed. The discussion included a description of the data collection stages, in addition to the setting of interviews questions. The chapter ended by identifying the proposed analysis strategy.

This chapter will focus on the empirical research stage, furthermore it will present the data analysis and the outcome results of the first stage of data collection. In which, it will clarify the IS project managers' viewpoint with respect to the challenges of incomplete knowledge transfer and project escalation. Moreover, this chapter focuses on the first aim of this research, in terms it concerns with the reasons behind and the relationship between the two mentioned challenges.

Noteworthy, the challenge of incomplete knowledge transfer will be referred to as 'Unclear ideas' or 'Unclear ideas and requirements', moreover using the same concept, the case of complete knowledge transfer will be referred to as 'Clear ideas' or 'Clear ideas and requirements'. This is how they were mentioned by the majority of the research sample.

5.2 The Analysis of the First Stage of Data Collection

In the first stage, the data was collected through conducting semi-structured interviews with 30 IS project managers from five different Saudi organisations.

On a positive note, the majority of the interviewees had a reasonable level of understanding. Most of the participants were aware of the concept of project escalation. For example:

> "Actually, I experienced a situation of a project escalation myself. At that time we did not expect the huge increment in the cost, and the extension of working-time, which eventually kept the project open for a very long time. The actual development time exceeded the original plan by four or five times more". (PM_5)

Though the answers of IS project managers informed what they believed is related to project escalation according their perceptions and expertise, their responses did not report the extreme situations of totally losing control over a runaway project as described in the literature (e.g. Keil, 1995). This presents a difference in theory and practice of project escalation. Both approaches share the general signs, like the unexpected and eventual increment in the budget, and unpredicted critical extensions of working and delivery times. However, this escalation does not necessarily reach excessive levels of lost control according to the practical perception.

The following will describe each step of the analysis process in more detail.

5.2.1 Main Themes and Constructs

The first round of the analysis aimed to identify the main themes of the data, so it started with Open Coding which distinguishes crucial words and then categorises them into theoretical themes. Axial coding was used to examine the relationships between the themes and sub-themes, and led to regrouping the coded data in a more coherent way. This resulted in the first draft of the outcomes containing 18 themes within two general constructs. Then, after two more refinement rounds, which focused on selecting the more relevant themes and merging similar categories, it ended with a total of 11 main themes within two general constructs. These constructs and themes were being derived from the data literature, and guided by the main aspects of the research as follows.

Construct (A): Knowledge Transfer

According to the project managers' viewpoint, this construct explored the factors and practices that facilitate knowledge transfer between the customer and the developers, and the effect of clear ideas and requirements on project operation. This construct then set the focus on the reasons behind customers' unclear ideas, and the impact on project planning and outputs. Additionally, there was a discussion regarding how to deal with the issue of unclear ideas.

Construct (B): Project escalation

In this construct, the issue of project escalation is discussed, according to the viewpoint of the project managers, in terms of the reasons behind it, how to detect it, and the best practice to deal with it.

Table 5.1 and 5.2 offer more details about the themes and their subthemes.

Table 5.1: The First Construct and its Themes

Construct (A): Knowledge Transfer
A.1 Factors facilitating knowledge transfer A.1.1 Knowing the nature of the customer's business A.1.2 The customer has a technical background A.1.3 Identifying the customer's knowledge source A.1.4 Setting greater focus on analysis A.1.5 Having effective communication with the customer A.1.6 Adopting ready-made solutions
A.2 Knowledge transfer techniques A.2.1 Knowledge transfer methods A.2.2 Knowledge transfer verification methods
A.3 The effect of clear ideas and requirements A.3.1 More accurate planning, resource and time estimation A.3.2 Smother implementation A.3.3 Reduces errors and later modifications
A.4 Reasons behind unclear ideas and requirements A.4.1 Customer is unable to clarify A.4.2 Customer's lack of communication A.4.3 The incompetency of the customer's knowledge source A.4.4 Customer's multiple knowledge sources contradictions A.4.5 The customer keeps adding requirements A.4.6 Developers' inadequate analysis A.4.7 The nature of IS development
A.5 The impact of unclear ideas and requirements A.5.1 Increase in the cost, time and effort A.5.2 Product's poor quality A.5.3 Negligence when using the product A.5.4 Failure of the project
A.6 Detecting unclear ideas A.6.1 Review meetings with the customer A.6.2 Difficult implementation and programming A.6.3 Customer complains when testing the product
A.7 Dealing with unclear ideas A.7.1 Identifying where the problem is A.7.2 Meeting and verifying the situation with the customer A.7.3 Negotiating with the customer

Source: Developed by the author

Table 5.2: The Second Construct and its Themes

Construct (B) Project escalation
B.1 Actors behind project escalation B.1.1 The project manager B.1.2 The developers B.1.3 The IS senior management B.1.4 The customer B.1.5 Other parties
B.2 Reasons behind project escalation B.2.1 Poor planning and operating B.2.2 Lack of human resources B.2.3 Workload B.2.4 Unclear ideas B.2.5 Scope changing B.2.6 Project size is too large
B.3 Detecting project escalation B.3.1 Project is monitored by a third party B.3.2 The later increase in customer's requirements B.3.3 Comparing progress with project plan
B.4 Dealing with project escalation B.4.1 Being prepared B.4.2 Pausing and assessing situation B.4.3 Dealing with the challenges accordingly B.4.4 Splitting the project into sub-projects B.4.5 Involving senior management B.4.6 Rejecting the project B.4.7 Reasonably allowing escalation

Source: Developed by the author

Worth noting is a number of the mentioned sub-themes contain other sub-themes which will be discussed throughout the rest of the analysis.

The following are the developed analysis Tables 5.3 and 5.4 during this stage of analyzing the data.

Table 5.3: Identifying Themes of: Construct (A) Knowledge Transfer

Key Theme	Evidence	Interpretation	Related theme
A.1 Factors facilitating knowledge transfer	"Learning about similar products, from this form, would help to maintain my expectations about customer's business and his needs" (PM_13)	The existence of similar products	A.1.1 Knowing the nature of the customer's business
	"Actually, when you send a programmer to the customer's organisation, it is like training. And if this isn't enough we should train him." (PM_17)	Train the developers	
		Visiting customer's working place	
	I'll use this information to get brief details about the new system, and to find the project manager and developers with experience of the customer's business."(PM_25)	Choosing project manager with experience	
		Choosing developers with experience	
	"The customer should take training in how to use computers. This will help to explain how the computer software will look and work." (PM_14)	Train the customer to use computer software	A.1.2 The customer has a technical background
	"It is better to assign someone from the customer organisation who is experienced in his job and has a good idea about IS development, in order to enhance requirement elicitation." (PM_24)	Choosing a representative with technical experience	
	"It is better to assign someone from the customer organisation who is experienced in his job and has a good idea about IS development, in order to enhance requirement elicitation." (PM_24)	A.1.3 Identifying the customer's knowledge source	
	"Having a big picture is not enough. You should dig more and more to cover all the tiny details even if it takes a longer time… spending more effort during the analysis will save a lot of trouble later." (PM_16)	A.1.4 Setting greater focus on analysis	
	"Before meeting the customer, it is very important to have mutual trust, well, in the event that there is no trust, then there is no project." (PM_19)	A.1.5 Having effective communication with the customer	
	"It is easier to buy a ready-made solution from the shelf. Just pick a suitable package, and follow the blueprint to customise it to your needs. This wills shortcut the whole story of requirement elicitation." (PM_5)	A.1.6 Adopting ready-made solutions	

Key Theme	Evidence	Interpretation	Related theme
A.2 Knowledge transfer techniques	"Before the meetings, there are some papers that should be filled in by the customer. It is like a general questionnaire about the system and its inputs and outputs." (PM_25)	Forms and Questionnaires	A.2.1 Knowledge transfer methods
	"Usually there is a big meeting which gathers everyone in the project. Then a discussion will take place to review the main ideas and brainstorm the requirements. We call this a JAD session." (PM_4)	JAD Sessions and meetings	
	"In this workshop, the customer will demonstrate his business and what system he needs. Then we discuss the requirements later." (PM_27)	Workshops	
	"First there is the process model, where we test different business scenarios, and see whether or not it covers all cases." (PM_15)	Developing Process Model	A.2.2 Knowledge transfer verification methods
	"Using the prototype and displaying its GUI on a computer screen is very useful to confirm a customer's requirements. This will help to avoid any surprises later." (PM_14)	Developing Prototype	
	"During these meetings, we have to write down everything in order to produce business requirement documents later." (PM_9)	Documentation	
	"Signing the contract is the trigger to start the development, as the customer won't add any further requirements or descriptions"(PM_2)	Acceptance and signing the contract	
A.3 The effect of clear ideas and requirements	"The most important thing it that the plan is built on correct requirements. So the programming will actually go according to the plan." (PM_28)	A.3.1 More accurate planning, resource and time estimation	
	"If the requirements were all clear, then programming becomes easier and faster." (PM_22)	A.3.2 Smoother implementation	
	"…Yes there may be some bugs, but we can fix them in no time" (PM_22)	A.3.3 Reduces errors and later modifications	

Key Theme	Evidence	Interpretation	Related theme
A.4 Reasons behind unclear ideas and requirements	"One of our biggest problems is that the customer does not know what he wants. Usually he comes with general ideas, and skips some points unintentionally." (PM_7)	General idea with no details	A.4.1 Customer is unable to clarify
		Unintentionally skip mentioning some points	
	"One of our customer's was not that academically educated. In which, this unfortunately reflected on his way to talk and deal with people. So, I could not communicate with him in an effective way" (PM_10)	The level of customer education	
	"It can't work with a customer who does not cooperate with us, ignoring our inquiries and skipping the meeting will not help to understand anything." (PM_3)	A.4.2 Customer's lack of communication	
	"This misunderstanding happened because the person who gave us the requirements was not knowledgeable, and he was not the end user of the system." (PM_15)	Lack of business's experience to answer the inquiries	A.4.3 The incompetency of the customer's knowledge source
	"After 4 months I was surprised this man would not accept the project, actually he is not the decision maker." (PM_29)	Not in a position to make a decision	
	"The problem with multi-knowledge sources is that everyone gives information which contradicts others' information." (PM_1)	A.4.4 Customer's multiple knowledge sources contradictions	
	"We suffer when the customer kept adding more and more requirements; this put us in a dilemma as they contradict with what they requested in the earlier stage of the requirements gathering." (PM_19)	A.4.5 The customer keeps adding requirements	
	"Some developers and project managers do not ask enough questions when collecting user requirements, and make their own assumptions during the system design. This will eventually lead to conflict between the delivered system and the users' expectations." (PM_13)	Lack of analytic experience	A.4.6 Developers' inadequate analysis

Key Theme	Evidence	Interpretation	Related theme
A.4 Reasons behind unclear ideas and requirements (Continue)	"You should have more than enough time to collect and analyse the requirements, otherwise you will end with vagueness later." (PM_26)	No enough time to gather the requirements	A.4.6 Developers' inadequate analysis
	"Yes the developer knows about IS development, but every time they need to learn about human resources, marketing, finance … etc. I believe that it is challenging to learn a new business every day, and I can't blame anyone for this." (PM_5)	A.4.7 The nature of IS development	
A.5 The impact of unclear ideas and requirements	"Dealing with these numerous problems because of unclear ideas adds additional cost and effort, besides the extra time to do it." (PM_29)	A.5.1 Increase in the cost, time and effort	
	"In case there are a huge number of modifications, you can image the effect of each of these batches on other system functions, which misleads the developers and leads to other logical problems!! The result is another troubled product." (PM_30)	A.5.2 Product's poor quality	
	"In the event that a project is completed with unclear ideas or missing requirements, the customer neglects the system and never uses it. Unfortunately this happens a lot of times." (PM_1)	A.5.3 Negligence when using the product	
	"A big system has been rejected and considered to be a failure because it missed one function, which was not explained clearly earlier!" (PM_19)	A.5.4 Failure of the project	
A.6 Detecting unclear ideas	"During the QRM's, the customer should sign for and approve what has been completed in the project, otherwise he should report his complaints." (PM_3)	A.6.1 Review meetings with the customer	
	"These confused requirements lead to a lot of trouble when putting them to programming later." (PM_2)	A.6.2 Difficult implementation and programming	
	"Even through all these procedures, the unclear ideas may still be present at the end when the customer tests the product." (PM_15)	A.6.3 Customer complains when testing the product	

Key Theme	Evidence	Interpretation	Related theme
A.7 Dealing with unclear ideas	"We have to find what leaded to this misunderstanding. Is it because of me and my programmers? Or maybe because of the customer? And what requirements did they not understand?" (PM_6)	A.7.1 Identifying where the problem is	
	"In any case, it is important to arrange a meeting with the customer to clarify everything." (PM_8)	A.7.2 Meeting and verifying the situation with the customer	
	"In case these later clarified requirements are not essential, maybe we can skip them, or accomplish them as a new version of the product later.. it depends on the customer's decision." (PM_29)	To not undertake the modifications	A.7.3 Negotiating with the customer
		To undertake the changes in new release of the product	
	"We assess the modifications and discuss with the customer the possibility of coping with these partially. Or maybe adjust project plan to do them all because the customer is responsible for these unclear requirements." (PM_24)	To undertake some of the changes	
		To adjust the current project plan	

Table 5.4: Identifying Themes of: Construct (B) Project Escalation

Key Theme	**Evidence**	**Interpretation**	**Related theme**
B.1 Actors behind project escalation	"Mis-estimating the time needed by the project manager led the project to escalate. This includes the project plan and all types of resources. So it affects one phase, which affects other phase, and so on. I blame the poor experience." (PM_21)	Lack of experience and qualifications	B.1.1 The project manager
	"he claimed attending the meetings with the customers and other departments were none of his roles … so this mis-coordination led to the project escalating." (PM_14)	Unidentified duties and responsibilities of the manager	
	"What do you expect the result to be when the manager acts against the developers and ignores their viewpoints and complaints? It feels like a manager who works against, not with, the developers." (PM_9)	Poor relationship with developers	
	"So the programmer was busy in other part-time job and neglected working on the project." (PM_28)	Lack of a developer's experience and commitment	B.1.2 The developers
	"so if the programmer is less able to adapt with introduction of new technology, this would badly impact on his performance and obstacle project running" (PM_12)	Learning new technology during working	
	"One of the reasons is replacing a programmer with a new one. So this consumes more time to tell him about the project and its requirements." (PM_2)	Educating the recent added staff about the project ideas	
	"All these developers had a number of training courses in programming. Though, due to individual differences, they are not at the same level of ability to achieve hard tasks" (PM_5)	Individual differences	

Key Theme	Evidence	Interpretation	Related theme
B.1 Actors behind project escalation (Continue)	"I hate it when the customer force us to do what he wants, and interferes with my job duties, he misses with the schedule because of his added requirements… this happened because of the relationship with our senior manager who approved these changes." (PM_29)	Lack of supporting development team	B.1.3 The IS senior management
	"…actually he was looking for personal credit at the expense of the escalation." (PM_27)	The existence of corruption and hidden agenda	
	"Every day, three managers from different managerial levels were visiting my office and interfered with my duties to do the project according to their different needs and various viewpoints… I could not achieve anything with that project which lasted more than two years." (PM_23)	Overlapping functions within the managerial hierarchy	
	"One of the senior managers set a short delivery time which didn't fit with a big project like this one. Because of the pressure, we could not properly collect the requirements, and we needed 18 months instead of four weeks." (PM_2)	Adding pressures in time and resources	
	"These people have hidden agendas beyond project success. Because of this, they keep adding requirements for the sake of other people, and that kept the project open, and badly exceeded its planned time and budget." (PM_16)	Customer has hidden agenda	B.1.4 The customer
	"You should expect a lot of trouble like the escalation in case your customer is not that aware with respect to rules of IS development practice… he must realise that adding more requirements later is not allowed, and the testing phase is the time to report all the problems.. I hate it when he does that after the delivery." (PM_19)	Lack of awareness in terms of developing and using IS products	
	"It happened because of the delay by an outside company which installed the hardware and trained us to use it." (PM_4)	B.1.5 Other parties	

Key Theme	Evidence	Interpretation	Related theme
B.2 Reasons behind project escalation	"Usually it happens because of poor planning in the first place as there is no accurate time or resource estimation, which will put your project in trouble later, like disregarding the seasonal holidays in Ramadan. So, no wonder if the actual project progress missed the deadlines or fail to accomplish the milestones on time. Actually this poor running of the project is another reason behind the escalation" (PM_25)	Inaccurate estimation for resource or task needed time	B.2.1 Poor planning and operating
		The actual progress does not comply with the plan	
	"The absence of risk management leads to escalation, where there is no cover plan, so any emergency can be an obstacle to the project and consume more time and effort to find a solution." (PM_19)	Skip setting an emergency cover plan (Risk Analysis)	
	"That one project escalated because of the shortage in human resources, under the pressure of multitasking, there was no enough time to finish the planned tasks, so we kept working for a very long time, which introduced additional cost as well." (PM_7)	B.2.2 Lack of human resources	
	"You can't focus when working on more than one project at the same time. This increases the workload and exhausts the developers, so more effort and additional time are highly expected, which leads to exceeding the original plan." (PM_5)	B.2.3 Workload	
	"Escalation is happening 100% because of the customer's unclear ideas. I can't see any other reason." (PM_12)	B.2.4 Unclear ideas	
	"In one escalation occasion, the scope was not clear in the first place, and it did not include everything, so when it changed in the middle of the development stage, it felt like doing another brand new project which contradicted the original plan and budget." (PM_19)	B.2.5 Scope changing	

Key Theme	Evidence	Interpretation	Related theme
B.2 Reasons behind project escalation (Continue)	"Usually escalated projects are the ones that require more than 500 weeks. Actually it is easier to deal with small projects, but not with ones at this huge size." (PM_8)	Controlling becomes harder proportionally to project size	B.2.6 Project size is too large
	"Building a room is not like building a skyscraper. It is harder to control everything, besides the additional workload for working in big projects." (PM_5)	Need for resources increases proportionally to project size	
B.3 Detecting project escalation	"The PMO is in contact with the project manager to monitor project progress, and they can spot any escalation." (PM_9)	B.3.1 Project is monitored by a third party	
	"In the event that there are more customer requirements, this means that my project is escalating, particularly when we are close to the delivery date." (PM_14)	B.3.2 The later increase in customer's requirements	
	"If I am working on part of the project, and this part takes longer than what planned for, then I figure out there is a sign of escalation here. So checking the completed task and milestones helps to monitor the project." (PM_6)	B.3.3 Comparing progress with project plan	
B.4 Dealing with project escalation	"Extra time spent on requirement elicitation could save a lot of time during project development, and could be a major factor in avoiding escalation." (PM_11)	Focus more when planning	B.4.1 Being prepared
	"A good project manager should apply risk management analysis in the earlier stage, so you will know if the project will escalate and how to manage the situation." (PM_16)	Use risk analysis	
	"In such troubled and challenging situations like escalation, this requires consulting a highly professional manager to deal with it, actually it is better to assign one to manage a critical project from the beginning." (PM_8)	Assign more experienced project manager	

Key Theme	Evidence	Interpretation	Related theme
B.4 Dealing with project escalation (Continue)	"In our plan, we consider adding 15% more time and cost, and we mention these as a tolerance of one just in case." (PM_10)	Add tolerance time and resources when planning	B.4.1 Being prepared (Continue)
	"The first thing is holding everything and stopping for a while to investigate the situation. Besides this will help to continue with other projects." (PM_26)	B.4.2 Pausing and assessing the situation	
	"There is no such thing as a universal solution, sometimes adding more resources can deal with the situation, or maybe by monitoring or warning the lazy programmers." (PM_16)	B.4.3 Dealing with the challenges accordingly	
	"Splitting the project into smaller pieces is very useful, as dealing and controlling smaller projects is much easier. So, the current project is completed, and the next phase will have a new plan and budget which considers solving all the challenges that led to the escalation." (PM_3)	B.4.4 Splitting the project into sub-projects	
	"In the case where it is out of the project manager's control, then he should pass on the situation to senior management for them to take privileged action." (PM_12)	B.4.5 Involving senior management	
	"Once I received the approval from the higher management, I rejected the escalated project… maybe we completed 80%, but we saved a lot in comparison to the expected loss of it continuing, actually we freed valuable resource to work in other projects." (PM_19)	B.4.6 Rejecting the project	
	"It depends on the organisation's polices and the views to future investment with the same customer. This rarely happens, but the higher management allowed escalating the project up to a certain level for the sake of future investment with the customer." (PM_12)	B.4.7 Reasonably allowing escalation	

5.2.2 Narrative

The narrative summarises and links the research concerns and interviewees' answers (Auerbach and Silverstein, 2003). Thus, it reports the IS project managers' subjective experience in terms of the viewpoints of the suggested constructs and themes. In the following, the narrative will be presented based on the IS project managers' viewpoint.

A. Knowledge Transfer

● *A.1 Factors facilitate knowledge transfer*

According to these project managers, there are a number of factors which facilitate the transfer of knowledge between the customer and the developers. The first factor is learning about the customer's business. This helps the developers to establish a reasonable background, which in turn helps to identify any gaps and allows closing any differences in the viewpoints between the developers and the customer. Furthermore, the data suggests that developer or project manager may have valuable experience in the business from working on previous projects, which may be related to the customer's field of work (e.g. human resources, accounting, and finance). Also, another possible way is to train the developers, or perhaps by sending them to the customer's work place. Therefore, the developers can practice and see the process running real time.

> "It is really useful to know about the customer's business. In fact, we should send the programmers to the customer's work place to learn about the nature of their business" (PM_3)

> "Actually, when you send a programmer to the customer's organisation, it is like training. And if this isn't enough we should train him." (PM_17)

Moreover, the project managers mentioned it is possible to know about customer's business and needs in case of the existence of similar IS product. Thus, checking this similar product helps the developers to maintain their expectation with respect to customer's requirements.

> "Learning about similar products, from this form, would help to maintain my expectations about customer's business and his needs" (PM_13)

Also, the technical background involves using computer software. This may help the customer to describe the ideas in a way which the developer could better understand. Thus, training the customer to use the technology is also useful.

> "The customer should take training in how to use computers. This will help to explain how the computer software will look and work." (PM_14)

Another factor, according to the data, is to identify the source of knowledge from the customer's side. Moreover, sometimes senior managers from the customer side, who usually sign the contract, do not have much detailed knowledge about the proposed system. Therefore, it is recommended that a knowledgeable source who knows about the system in depth, like the end user of the proposed system, be assigned. Also, this source most likely has the answers to the developer's enquiries, which would help to maintain the project's scope.

> "I need to know all the details about the system and how it will work. Well, usually the customer's management does not have all the details. I prefer to meet the employees who will use the system, because they know everything." (PM_25)

Furthermore, the interviewees recommended this knowledge source has a reasonable background about IS development, in addition to the experience of working in the customer's business. Therefore, this knowledge source is able to speak both languages, IS development and business, which support the process of knowledge transfer.

> "It is better to assign someone from the customer organisation who is experienced in his job and has a good idea about IS development, in order to enhance requirement elicitation." (PM_24)

Setting more focus on the analysis stage is another factor. Furthermore, requirements gathering and analysis is one of crucial steps in a project's life.

Also, it could be considered as “the most important stage of all”, in that all the next steps will be built on this one. For this reason, the developers may not move to the development stage if the customer’s ideas and requirements are not particularly clear. Therefore, having a general idea is not enough. However, spending sufficient time at this stage to cover all details is significant.

> “Having a big picture is not enough. You should dig more and more to cover all the tiny details even if it takes a longer time… spending more effort during the analysis will save a lot of trouble later.” (PM_16)

> “Do not commit a delivery date to the customer. Take enough time to clarify the requirements.” (PM_13)

One more factor, as pointed out by the project managers, is to gain the customer’s trust. Thus, keeping the customer updated with regard to the progress and challenges may significantly facilitate knowledge transfer. In such a case, the customer would show more understanding and cooperation when it comes to supporting the developer. As a result, this will lead to the development of effective communication between these two parties in terms of a quick response to any inquiries the developers may have at any time, and establish more than one contact channel (e.g. eMails, Phones and Meetings).

> “Before meeting the customer, it is very important to have mutual trust, well, in the event that there is no trust, then there is no project.” (PM_19)

> “The customer must be updated with the progress and the problems, even if it is not easy to contact him.” (PM_21)

An additional factor that may ease knowledge transfer is to adopt a ready-made software solution. This solution is computer software which was previously produced based on best practice and experts’ recommendations in a specific field (e g. ERP, human resources and accounting). This solution is then sold as a ready-made package to the industry. So, what the customers have to do is to apply a few modifications to suit it to their needs. Furthermore, this seems easier, compared to starting from scratch and building a new system.

> "It is easier to buy a ready-made solution from the shelf. Just pick a suitable package, and follow the blueprint to customise it to your needs. This wills shortcut the whole story of requirement elicitation." (PM_5)

● *A.2 Knowledge transfer techniques*

According to the project managers there are a number of methods and techniques used to transfer knowledge. Furthermore, at the beginning of the requirement gathering and analysis stage, the customer usually fills in a number of forms and questionnaires. These to gather the general ideas about the desired IS product, its basic in-puts and out-puts, who are the target users and who may be affected by this product. This method seems useful as a starting point for the knowledge transfer process.

> "Before the meetings, there are some papers that should be filled in by the customer. It is like a general questionnaire about the system and its inputs and outputs." (PM_25)

Another method involves the various style of meeting. The most common style is called Joint Application Development (JAD) , where the customers' stakeholders meet the IS development people. In such a session, the two parties discuss, or brainstorm, the requirements and the expected functions of the IS product. Another meeting style is the classic one-to-one, where the customer answers a number of open-ended, and then close-ended questions, in order to cover as many details as possible.

> "Usually there is a big meeting which gathers everyone in the project. Then a discussion will take place to review the main ideas and brainstorm the requirements. We call this a JAD session." (PM_4)

The data analysis suggest that sometimes the customer hosts the meeting, and demonstrates the workings of the business and its current activities, and then presents a number of suggested requirements for the desired IS product. Later, the IS development people provide comments and

recommendations to clarify the requirements. This style of meeting is called a workshop.

> "In this workshop, the customer will demonstrate his business and what system he needs. Then we discuss the requirements later." (PM_27)

The next step after transferring the knowledge, as suggested by the interviewees, is to confirm what has been received. In order to achieve this, the developers try to verify the customer's requirements and goals through a number of methods. The first one is to develop a process model, which aims to test different business cases and scenarios by simulating them on a flow chart diagram.

> "First there is the process model, where we test different business scenarios, and see whether or not it covers all cases." (PM_15)

Then, it is time to produce a prototype, which involves the screens' design for the proposed IS product with almost no serious coding. Actually, providing this graphical user interface (GUI) on a computer screen is considered as one of the most highly effective methods to confirm the customer's requirements. Therefore, the customer's feedback is critical here.

> "Using the prototype and displaying its GUI on a computer screen is very useful to confirm a customer's requirements. This will help to avoid any surprises later." (PM_14)

What comes next is to record and document everything (general ideas, requirements in detail, process model, and prototype). Then, the customer should approve them all, otherwise the customer's concerns and notes should be collected and sent back to the developers, in order for them to revise it and correct the document accordingly. Finally, the approved documentation should be signed by the customer and included with the contract and agreement.

> "During these meetings, we have to write down everything in order to produce business requirement documents later." (PM_9)

> "Signing the contract is the trigger to start the development, as the customer won't add any further requirements or descriptions" (PM_2)

● *A.3 The effect of clear ideas and requirements*

As highlighted by the project managers, there are a number of benefits arising from the clear ideas and goals of the customer. In addition, as long these goals are understandable at an early stage; this will help to set an enhanced time estimate for the tasks. Furthermore, this leads to more accurate project planning and resources, with no major changes during project operations.

> "The most important thing it that the plan is built on correct requirements. So the programming will actually go according to the plan." (PM_28)

Furthermore, once the developers have received the clear ideas, then the implementation process becomes smoother. In addition, it may reduce errors and fixes later in the testing stage. Besides, even if there are any mistakes, it seems likely that these will be minor ones, which are possible to deal with in a manageable time.

> "If the requirements were all clear, then programming becomes easier and faster. Yes there may be some bugs, but we can fix them in no time" (PM_22)

In addition, as the final product represents the customer's goal, then it seems that clear ideas positively affect customer satisfaction when delivering the product.

> "Clear requirement will benefit both parties, and customer satisfaction is guaranteed here, because he got what he wanted." (PM_17)

● *A.4 Reasons behind unclear ideas and requirements*

According to the project managers there are several reasons behind a customer's lack of clarity in terms of ideas. The first one is that the customer is unable to explain the goals clearly. So, the customer has only a general idea with almost no detail in terms of business requirements. Furthermore, occasionally, the customer may unintentionally skip some main points when discussing requirements. This may happen due to the routine of the practice. In

other words, the customer is under the illusion that everybody already knows what the customer is talking about.

> "One of our biggest problems is that the customer does not know what he wants. Usually he comes with general ideas, and skips some points unintentionally." (PM_7)

Another possible reason for ideas' lack of details is the limited level of education the customer has, which may negatively impact on communication quality with the developers.

> "One of our customer's was not that academically educated. In which, this unfortunately reflected on his way to talk and deal with people. So, I could not communicate with him in an effective way" (PM_10)

According to the data analysis, the next reason is the incompetency of the customer's knowledge source. Therefore, the customer's project coordinator may have an insufficient background regarding the project requirements, or may have a lack of experience regarding business, in terms of answering the developers' inquiries.

> "This misunderstanding happened because the person who gave us the requirements was not knowledgeable, and he was not the end user of the system." (PM_15)

Furthermore, the interviewees pointed out that this coordinator may not be in a position to make a decision in terms of accepting the developers' suggestions. Thus, every time, this coordinator has to ask someone else in the customer's organisation. Furthermore, this coordinator may transfer a personal viewpoint regardless of the main requirements of the IS product, particularly when this coordinator is not the end user.

> "After 4 months I was surprised this man would not accept the project, actually he is not the decision maker." (PM_29)

In some cases, for the same project, there may be users from more than one department in the customer's organisation. Furthermore, each department has its own knowledge source. Therefore, there is a chance that the knowledge

from one source may contradict the knowledge from other. In addition, this issue particularly occurs when it is not possible to combine these sources in one meeting. Also, in other cases, the developers gather requirements from one or two sources only, and skips the rest by mistake. For instance, other sources may have no time for meetings, or the customer did not mention other sources from the beginning. A further point is that during the long running of a project, the developers may meet more than one of the customer's coordinators, so, it is not that clear who can take accredited decisions on the customer's side.

> "The problem with multi-knowledge sources is that everyone gives information which contradicts others' information." (PM_1)

Another reason is the continuous adding of more requirements by the customer, particularly after completing the requirement elicitation stage and starting the development stage. As a result, the project may have an unlimited number of extra requirements which are highly likely to contradict earlier requirements in terms of the functions, business process, or design description.

> "We suffer when the customer kept adding more and more requirements; this put us in a dilemma as they contradict with what they requested in the earlier stage of the requirements gathering." (PM_19)

> "It is seriously confusing because of these creeping additional requirements… actually this challenges what we previously learnt about their business process and functions." (PM_28)

As project managers mentioned, during the project running time, the customer should cooperate and spend sufficient time with the developers in order to efficiently transfer the necessary knowledge. Thus, this requires staying in contact, answering any enquiries, and providing all the help that the developers may need. However, any lack in communication leads to a negative impact, for instance, not attending the requirement gathering meetings, ignoring the answering of questions regarding the business, not providing samples of used forms and reports, or not doing the testing part in depth. As a result, this may lead to having implausible expectations regarding the final product.

> "Sometime there is a lazy customer who has no enthusiasm. He just throws in some words and disappears." (PM_22)

> "It can't work with a customer who does not cooperate with us, ignoring our inquiries and skipping the meeting will not help to understand anything." (PM_3)

A further reason is that, the main purpose of the analysis stage is to gain the customer's knowledge and requirements, including as much detail as possible. This is too early to deal with any possible misunderstandings before starting the development stage. However, in the event that there were some issues during the analysis stage, this may lead to unclear ideas later. There are a number of reasons that may lead to this inadequate analysis process. For instance it may happen because of a lack of analytic experience on the part of the developers. Furthermore, this may occur because there was not enough time given to gather the requirements. In addition, another reason may be the incomplete documentation of the requirements, which results in a number of missing details, and the production of gaps in the scope.

> "Some developers and project managers do not ask enough questions when collecting user requirements, and make their own assumptions during the system design. This will eventually lead to conflict between the delivered system and the users' expectations." (PM_13)

> "You should have more than enough time to collect and analyse the requirements, otherwise you will end with vagueness later." (PM_26)

> "Never rely on personal memory as it is high likely to be forgotten, this is why writing it down and documenting everything during RE is very important." (PM_6)

The project managers reported that due to the nature of IS development, there are some challenges that may impact on the knowledge transfer process. For example, as long as there are new customers from different business fields, every time the developers need to learn new aspects about these new customers' business. Furthermore, both the customer and the developers speak different languages which are related in each field of work.. So, if the customer

said something, the developer may misinterpret it. Of course it could be the same word. However, it may have different meanings in each field of work.

> "Yes the developer knows about IS development, but every time they need to learn about human resources, marketing, finance … etc. I believe that it is challenging to learn a new business every day, and I can't blame anyone for this." (PM_5)

● *A.5 The impact of unclear ideas and requirements*

According to the project managers there are a number of consequences of a customer's unclear ideas. Furthermore, as project planning is based on these ideas and requirements, building on unclear ones leads to inaccurate planning in terms of time and resources. As a result, more modifications and fixes are expected later, and this requires spending extra effort and adding more resources. So, dealing with the modifications in code will increase in cost. Besides, it requires additional development time, and this delays the delivery date.

> "More development time is needed due to changes in user requirements, and eventually led to a late delivery date. Changes in system design become necessary at this stage because things only then get clarified." (PM_6)

> "Dealing with these numerous problems because of unclear ideas adds additional cost and effort, besides the extra time to do it." (PM_29)

In addition, this enormous number of corrections and modifications may act as an obstacle to the smooth running of the project, and may mislead the developers. Then, it can negatively impact on product quality.

> "In case there are a huge number of modifications, you can image the effect of each of these batches on other system functions, which misleads the developers and leads to other logical problems!! The result is another troubled product." (PM_30)

The project managers pointed out in some cases, depending on the viewpoint of the IS organisation, modifying the requirements and fixing the code is not one of the available options. Thus, the final product may be

released as planned in the first stage. This means that the IS product is not as the customer wanted. As a result, one of the possible customer reactions is to neglect this product and not use it at all. Furthermore, this is considered as a waste of time, effort and resources on the part of the developers, in the sense that there will be no more benefits for operating, maintaining or upgrading the product in the future.

> "In the event that a project is completed with unclear ideas or missing requirements, the customer neglects the system and never uses it. Unfortunately this happens a lot of times." (PM_1)

Besides, as this IS product does not suit the customer's needs and wants, poor satisfaction is highly likely in such a situation. Furthermore, it may take the form of unfortunate arguments and legal issues.

> "We are surprised when the customer complains, and claims this is not the required system. He does not seem satisfied at all." (PM_12)

The data analysis suggested depending on the IS organisation's policies and regulations, if the required modifications and fixes exceed a certain rate, senior management may declare this project to be a failure. This leads to cutting all resources and cancelling the plan. Unfortunately this could happen after completing most of the plan, because the unclear ideas may only appear in the testing stage.

> "A big system has been rejected and considered to be a failure because it missed one function, which was not explained clearly earlier!" (PM_19)

Another impact of unclear ideas is project escalation. More explanation with respect to this point is coming in the narrative of the next construct.

● *A.6 Detecting unclear ideas*

The project managers pointed out that it is possible to find out and detect unclear ideas or incomplete knowledge transfer through revision meetings (i.e. Quality Review Meetings (QRM), Status Update Meetings (SUM)). In such a meeting, the developers discusses with the customer what has been achieved up to that point, shows some completed parts of the product

if possible, and deals with any challenges, including unclear ideas. Besides, in these meetings, the customer should approve the progress and confirm what has been achieved in terms of fulfilling the requirements.

> "Usually we detect the unclear ideas in a status update meeting, when we show what has been completed and the achievements so far. Actually, with each meeting, there is a good chance for the customer to answer our inquiries and to give us his comments on the prototypes which get improved after each meeting." (PM_27)

> "During the QRM's, the customer should sign for and approve what has been completed in the project, otherwise he should report his complaints." (PM_3)

> "It is better to let the customer test each completed part of the project, therefore I can react earlier in the event if there is a problem." (PM_30)

In addition, as reported by the project managers, at the testing stage, which is just before delivering the IS product, the customer can see what the final product looks like, and examine its functionality. At this stage, the majority of customers identify any differences compared to what was expected of the IS product. In the event that there are any, the customer would complain and ask for fixes. This is considered as late evidence of an incomplete knowledge transfer.

> "Even through all these procedures, the unclear ideas may still be present at the end when the customer tests the product." (PM_15)

Furthermore, just as the customer does, it is possible to detect knowledge transfer issues from the side of the developers. For example, when there are a number of requirements contradicting other requirements, some results are calculated based on missing data, and some requirements lead to a logical error (i.e. dividing by zero). In other words, if the developer was not able to implement the requirement into coding, there may be a clue identifying a knowledge transfer difficulty.

> "The programmer reports back some logical errors due to misunderstood requirements." (PM_23)

> "These confused requirements lead to a lot of trouble when putting them to programming later." (PM_2)

● *A.7 Dealing with unclear ideas*

The project managers pointed out in the event of a knowledge transfer issue being detected, the first step is to revise the documents and to verify the requirements by contacting the customer. Therefore, more meetings would take place to discuss the requirements, and to investigate the details with more focus, in order to identify the gap due to the misunderstanding. These meetings involve the IS project manager with the customer. However, the developers' attendance is recommended.

> "We have to find what caused this misunderstanding. Is it because of me and my programmers? Or maybe because of the customer? And what requirements did they not understand?" (PM_6)

> "In any case, it is important to arrange a meeting with the customer to clarify everything." (PM_8)

Based on the impact on project operation and cost, the IS project manager should make a decision in terms of whether or not to undertake the modifications. In the event that these changes have no major effect, then it is possible to apply them. Otherwise, it may be better to discuss the situation with the customer in order to reach a suitable solution. For instance, the customer may be convinced to accept the current situation, or maybe by undertaking just some of the changes which don't impact on the original project plan. Furthermore, in some cases, senior management on the developers may accept the need to adjust the current project plan (e.g. extending the delivery time, allowing additional costs) to deal with the situation, and apply all modifications. Another solution is it to postpone the changes to another release of the product as a new project with a new plan.

> "We assess the modifications and discuss with the customer the possibility of coping with these partially. Or maybe adjust project plan to do them all because the customer is responsible for these unclear requirements." (PM_24)

> "In case these later clarified requirements are not essential, maybe we can skip them, or accomplish them as a new version of the product later.. it depends on the customer's decision." (PM_29)

B. Project escalation

● *B.1 Actors behind project escalation*

According to the project managers there are a number of actors who are involved in a project, and have an impact on its outcomes. One of them is the IS project manager who can have a serious impact on project escalation. Furthermore, the lack of experience and qualifications may be one of the factors behind an IS project manager's poor attitude in terms of inaccurate planning, lack of monitoring, and a poor ability to deal with challenges. Furthermore, sometimes unskilled mangers might be assigned because of the development organisation's Bureaucratic policy. In addition, another factor could be the responsibilities of the manager's unidentified duties. For instance, project manager may ignore the need to coordinate with other departments, or may skip regular meetings with the customer. This often happens under the pretext of these not being the manager's duties. Another point is that the relationship between the IS manager and the developers may represent another issue with regard to IS projects. Where there is a difference between a leader who supports the staff and deals with the developers' issues in order to ensure the success of the project, and between another one who gives orders because of project managerial privileges. An example of a poor relationship is where the IS project manager accepts all the customer's requests, regardless of their plausibility, and then forces the developer to do it without any discussion. Another example is the project manager who keeps arguing with the developer and does not allow any other viewpoints or suggestions. In such a case, this IS project manager looks like a "manager who works against, not with, the developers" or leads to an "unhealthy working environment". Consequently, this unfortunate relationship between the IS project manager and the developers can lead to the generation of serious internal issues.

> "Mis-estimating the time needed by the project manager led the project to escalate. This includes the project plan and all types of resources. So it affects one phase, which affects other phase, and so on. I blame the poor experience." (PM_21)

> "Due to seniority, an old person from a previous generation was assigned as a project manager, unfortunately he still working with an old mind… he claimed attending the meetings with the customers and other departments were none of his roles … so this mis-coordination led to the project escalating." (PM_14)

> "What do you expect the result to be when the manager acts against the developers and ignores their viewpoints and complaints? It feels like a manager who works against, not with, the developers." (PM_9)

The data analysis suggested project escalation my occurred as result of developers' attitude for a number of other reasons. Furthermore, one of the possible reasons is learning during working in a current running project. For instance, it may be that one more developer is added to the team and needs to learn about the business requirements from the beginning, or it may be that due to an urgent issue, the entire development team has been replaced with another team. Therefore, educating the new staff about the project ideas and progress, could involve more time and effort which, in turn, could lead to more delay.

> "One of the reasons is replacing a programmer with a new one. So this consumes more time to tell him about the project and its requirements." (PM_2)

Moreover, the lack of a developer's experience could also be one of the challenges, particularly with the rapid improvement that is happening daily in terms of IS development. Therefore, as an example, a developer may be trained well in the use of a specific programming language. A few years later, however, this knowledge may be out of date because of the introduction of a new technology. Moreover, even if there is a reasonable knowledge background, the developer's abilities and individual differences may result in a lack of task integration within the same project.

> "In the beginning of 90's we used ASSEMBLY programming language to write programs for the main-frames, then in the end of the 90's we learnt how to create PC standalone applications using Visual Basic. For the last five years we moved to web-based technology. Which means, to compete in the IS development market you should learn new technology every 7 years, otherwise you are outdated... so if the programmer is less able to adapt with introduction of new technology, this would badly impact on his performance and obstacle project running" (PM_12)

> "All these developers had a number of training courses in programming. Though, due to individual differences, they are not at the same level of ability to achieve hard tasks" (PM_5)

One more reason, as mentioned by the project managers, is the lack of commitment in the sense that the developer may have no sense of responsibility regarding job duties and respecting time. Additionally, the developer may have some hidden goals other than working on the project. For example, the developer may be planning to move to another department, or may be involved in other part time work. Thus the developer may not spend enough time working on the current project. Moreover, the shortage of enthusiastic and disciplined staff may be key factors behind this unhelpful behaviour.

> "So the programmer was busy in other part-time job and neglected working on the project." (PM_28)

> "This is the problem of your generation; you spend your time on Facebook rather than working" (PM_28)

Senior management can have a number of impacts on IS project escalation. Furthermore, the lack of senior management support for the developers can be a crucial issue in the sense that the senior management can take the customer's side instead. For example, due to internal affairs between the senior management and the customer, all the customer's added requirements are approved by senior management, which in turn may negatively affect the project plan. Furthermore, because of this affair, the

customer may interfere in the IS project manager's duties, such as changing the plan, or reprioritising tasks.

> "I hate it when the customer force us to do what he wants, and interferes with my job duties, he misses with the schedule because of his added requirements… this happened because of the relationship with our senior manager who approved these changes." (PM_29)

Another example is that, in some cases, senior management might make a promise to deliver a project in a short time without consulting with the developers. Therefore, this adds more pressure to completing the project at an earlier date in order to fulfil the promise. In other words, it is a matter of saving face and dignity, regardless of the consequences.

> "One of the senior managers set a short delivery time which didn't fit with a big project like this one. Because of the pressure, we could not properly collect the requirements, and we needed 18 months instead of four weeks." (PM_2)

According to the interviewees, another issue which senior management may suffer from is poor management. This may be particularly in cases where there is corruption, which gives personal interests precedence over public interests. In this respect, one form of poor management may be present when everyone tries to show themselves as the leader when it comes to a project's success, or in the event that there is competition to gain personal credit for the success. One more form of poor management is where there are overlapping functions within the managerial hierarchy. For instance, in the case the head of the organisation interferes in project management duties. So, this interference contradicts with the IS project manager's plans and instructions. In summary, poor management could have negative consequences for IS projects.

> "That person from the higher management forced us to work harder, accept all the major changes, and achieve the new requirements regardless of the consequences, which kept the project open for a long time… actually he was looking for personal credit at the expense of the escalation." (PM_27)

> "Every day, three managers from different managerial levels were visiting my office and interfered with my duties to do the project according to their different needs and various viewpoints… I could not achieve anything with that project which lasted more than two years." (PM_23)

The project managers reported that in some cases, the customer may negatively impact on the project and lead it to escalate. In this respect, the first factor for this is the existence of a hidden agenda, which means that the customer is looking for other goals rather than project success. For example, the customer may try to satisfy the senior management in the customer's organisation. Therefore, the customer keeps requesting any suggestions or comments, even silly ones, to be added and implemented, regardless of what the impact might be on the project operation or outcomes. Another example may be that the customer's coordinator may try to fail the current project, in order to sign a contract with another IS organisation, because this other IS organisation may be willing to pay a commission to the coordinator. Moreover, in some cases, the customer may exploit the good relationship with the IS organisation's senior management, to get involved in project management issues (e.g. change priorities and scope, reschedule tasks, extend project time, limit the IS project manager duties). As a result, this could lead to poor management and escalation. One more example is that the customer may resist change. Furthermore, the customer may not support abandoning ordinary paper work and move to the use of computers. As a result, the customer could misuse the IS product and fail its testing on purpose.

> "The responsible person from the customer side, who does the paper work, did resist the change. So he was complaining about every test and asking for more modifications." (PM_27)

> "These people have hidden agendas beyond project success. Because of this, they keep adding requirements for the sake of other people, and that kept the project open, and badly exceeded its planned time and budget." (PM_16)

> "The customer coordinator was behind a lot of problems during several stages of the project with no clear reason. We rejected that project later because it consumed a lot of effort and time, and significantly increased the budget, then

> we learnt that the coordinator assigned the project to one of his own relatives' development organisation." (PM_30)

> "Unfortunately due to a hidden affair, senior management took the customer's side and escalated the project according to his wishes in terms of interfering with my management duties or adding more requirements." (PM_27)

The data analysis suggested that another factor is the lack of a customer's awareness in terms of developing and using IS products. This means the customer does not pay enough attention to the rules when working with the developers. For example, collecting and stating the requirements comes in the earliest stage of the project, and no more requirements are allowed to be added later. Another example, testing the product and reporting the feedback is important to maintain any challenges before the delivery time., However the customer does not seriously consider the importance of this testing phase and does not critically perform this task, which leads to number of challenges later, and returns the project to the development phase after the delivery.

> "You should expect a lot of trouble like the escalation in case your customer is not that aware with respect to rules of IS development practice… he must realise that adding more requirements later is not allowed, and the testing phase is the time to report all the problems.. I hate it when he does that after the delivery." (PM_19)

Additionally, one of the common issues which may be occurred by the customer is putting forward unclear ideas and business requirements. This happens for a number of reasons as mentioned earlier within the previous construct. In some cases, in addition to the customer and the developers, there may be other parties involved in the project (e.g. out sourcing people, trainers). Moreover, as the IS project manager has no authority over these other parties, and then any delay or challenge occurred by these parties would impact on the project.

> "It happened because of the delay by an outside company which installed the hardware and trained us to use it." (PM_4)

In addition, usually an IS project involves more than one internal department within the organisation. For instance there may be the development department, the security department, and the database department. Furthermore, cooperation between these departments may have its impact on the project. Therefore, any mis-coordination may lead to administrative issues which create obstacles to project operation. Furthermore, sometimes, due to the complicated process (e.g. security challenges, bureaucracy in the routine), the project may escalate.

> "The security department added some obstacles and delayed the deployment, besides the administrative issues with their department" (PM_21)

● *B.2 Reasons behind project escalation*

As reported by the project managers, project escalation may occur due to the impact of a number of factors, one of them being poor planning and inaccurate task time estimation. Unfortunately, in some cases, the project plan does not reflect the actual process and the stages throughout the project lifespan. Instead, this plan is used as complementary document stored in the project folder. Furthermore, in order to create a project plan, the IS project manager estimates the time needed for each task. However, due to a number of reasons (e.g. lack of experience, lack of detailed requirements), it turns out later that a number of tasks require much longer than estimated in the plan. Moreover, the delay in one task may lead to a delay in another task, and so on. In addition, disregarding expected challenges which the project may face during operation, and ignoring setting an emergency cover plan, may put the project at risk when facing such a situation. Furthermore, as an example of expected risks, a foreign expert may not be able to attend because of government regulations, working time may overlap with special holidays (e.g. Ramadan, Haj), and a number of developers may have left the organisation at short notice. In other words, there may be a lack of risk management.

> "Usually it happens because of poor planning in the first place as there is no accurate time or resource estimation, which will put your project in trouble

> later, like disregarding the seasonal holidays in Ramadan. So, no wonder if the actual project progress missed the deadlines or fail to accomplish the milestones on time. Actually this poor running of the project is another reason behind the escalation" (PM_25)

> "The absence of risk management leads to escalation, where there is no cover plan, so any emergency can be an obstacle to the project and consume more time and effort to find a solution." (PM_19)

The interviewees added that the lack of human resources is another factor for project escalation. Additionally, in the event that there are only a limited number of dedicated developers for one project, this leads to assign more tasks to each developer. Furthermore, a developer may work on more than one project at the same time, known as "multitasking", so there is no dedicated human resource for a specific project. Thus, this leads to a shortage with respect to the needed time to work on a specific project which negatively impacts on the original plan and requires more time and, effort, and introduces additional cost to complete the project.

> "That one project escalated because of the shortage in human resources, under the pressure of multitasking, there was no enough time to finish the planned tasks, so we kept working for a very long time, which introduced additional cost as well." (PM_7)

Considering the resulted workload, because of the "multitasking" impact, this requires the developers to "jump" between unrelated tasks in more than one project, where each project has totally different ideas. Thus, the developer has to change the mode and the way of thinking accordingly. This in turn may affect the product's quality in terms of the number of the later code bugs and errors. As a result, complaints from the exhausted developers are expected. Hence, such a workload seems to have a negative impact, particularly when a sudden emergent project occupies all available developers, which affect the working plans of other projects.

> "Workload is another challenge, it feels like we are jumping between different projects which have various concepts and technologies at the same time, so losing the focus could be one of the important impacts." (PM_19)

> "You can't focus when working on more than one project at the same time. This increases the workload and exhausts the developers, so more effort and additional time are highly expected, which leads to exceeding the original plan." (PM_5)

> "An emergent project occupied all the developers and added more pressure on them, they were really tired and not that focused, as a result, an additional effort is required to fix all the programing errors which last twice as long as the development time." (PM_2)

Another factor that has been mentioned by the interviewees is the issue of unclear ideas as one of the most potent factors that leads to project escalation. Considering the impact of this issue as mentioned earlier (i.e. poor planning and quality, increase in costs and time and effort), these reasons seem to directly affect project operation. Furthermore, because of the unclear ideas, the final IS product may not satisfy the customer's expectations. As a result, the customer may complain and could request major modifications, which leads to an extension of working time and delays the delivery date. In other words, as this project is built on an incomplete basis of knowledge, and has inaccurate goals, then escalation is highly likely to occur.

> "Escalation is happening 100% because of the customer's unclear ideas. I can't see any other reason." (PM_12)

> "We had to collect the data in a very short time, this caused a lot of confusion regarding the correct business concepts and requirements… that project kept in an endless loop of modification and lasted 14 months instead of four weeks as originally planned." (PM_3)

Changing the project scope is another factor for project escalation. This may happen due to the vagueness in project goals from the beginning, or as a result of adding new requirements during the development stage. Also, adjusting the new scope or implying the new requirements may require major modification with respect to the completed task. Thus, increasing then effort and time is necessary in such a situation.

> "In one escalation occasion, the scope was not clear in the first place, and it did not include everything, so when it changed in the middle of the development stage, it felt like doing another brand new project which contradicted the original plan and budget." (PM_19)

> "Changing the scope meant modifying all the completed coding, and adding extra tasks to the original plan. So, with this additional workload it is difficult to keep the original plan or stay within the agreed budget, this means escalation is highly possible." (PM_23)

According to the data analysis, another factor behind project escalation is the large size of the project. Furthermore, controlling and monitoring the project becomes harder as the project size increases, in terms of working days, resources and cost. In addition, dealing with challenges and controlling the situation seems easier in smaller projects. However, it may be more challenging in larger projects. Moreover, in the event that there is a need for additional resources, the amount of these resources increases proportionally to the project size, which in some cases may not be that easy to supply.

> "Usually escalated projects are the ones that require more than 500 weeks. Actually it is easier to deal with small projects, but not with ones at this huge size." (PM_8)

> "Building a room is not like building a skyscraper. It is harder to control everything, besides the additional workload for working in big projects." (PM_5)

● *B.2 Detecting project escalation*

In order to detect project escalation, IS project managers suggest that the continuous reviewing of the progress and comparing it with the project plan is the preferred way. Furthermore, as the project plan includes all types of necessary resources (i.e. developers, budgets, and time), then any significant exceeding of one of these resources could be a sign of escalation. In addition, the milestones in any project plan tell us about project phases. Therefore, checking these milestones can state whether or not the phases have been

completed on time. However, without reviewing, the project manager may lose control over the project.

> "If I am working on part of the project, and this part takes longer than what planned for, then I figure out there is a sign of escalation here. So checking the completed task and milestones helps to monitor the project." (PM_6)

Another indicator of project escalation is the increasing number of customer requirements, particularly when these requirements are received during the implementation stage. Furthermore, as these additional requirements keep creeping in, they keep the project development running on endlessly.

> "In the event that there are more customer requirements, this means that my project is escalating, particularly when we are close to the delivery date." (PM_14)

> "These extra creeping requirements keep the project open forever, because they were not considered in the original plan." (PM_28)

The project managers pointed out another way to detect escalation is by a third party supervising and monitoring the project. One possible choice is to assign this job to another department in the IS development organisation, such as the Project Management Office (PMO), the Quality Assurance Department, or external consulting organisation. Furthermore, another possible way is by using a tracking system, where each developer summarises the progress at the end of the day. Therefore, using these monitoring techniques may help detect any sign of project escalation.

> "The PMO is in contact with the project manager to monitor project progress, and they can spot any escalation." (PM_9)

> "I prefer using the Project Track System, where no working hour is counted unless it is approved by the project manager." (PM_30)

> "Our project was monitored by the customer's consulting's organisation… actually that reduced the arguments and mistakes a lot from our and customer's sides" (PM_29)

● *B.3 Dealing with project escalation*

According to the project managers dealing with project escalation actually starts before it occurs. In other words, trying to avoid it, and preparing to deal with it happens in the first stages. In order to do this, there should be more focus in the analysis stage, during which more time and extra effort should be spent to verify all requirements and to confirm knowledge transfer. On the one hand, the customer and senior management may complain about the hard work and the length of time spent in the analysis stage. On the other hand, the benefits of doing this would significantly result in more accurate planning. Furthermore, in order to prepare for project escalation, risk management should be considered when planning. Hence, setting suggestions with regard to how to react in such cases is also crucial. Therefore, when implementing later, even in a situation such as a lack of resources or emergent issues, the developers would apply the alternative solutions as set out in the risk management plan.

> "Extra time spent on requirement elicitation could save a lot of time during project development, and could be a major factor in avoiding escalation." (PM_11)

> "A good project manager should apply risk management analysis in the earlier stage, so you will know if the project will escalate and how to manage the situation." (PM_16)

Furthermore, as taking action in serious situations such as project escalation, requires deep experience in project management. So, it is recommended to assign more skilled and qualified project managers in critical projects, or to consult one. This helps to minimise the negative impact by making accurate decisions, and professionally dealing with the situation. In addition, exchanging experiences and discussing project issues would educate less experienced managers.

> "In such troubled and challenging situations like escalation, this requires consulting a highly professional manager to deal with it, actually it is better to assign one to manage a critical project from the beginning." (PM_8)

> "It supposes that the project manager and programmers are learning and gaining experience when discussing the situation, so they won't fall into escalation situation again." (PM_9)

The data analysis suggested that another preparation method is considering a tolerance when planning in terms of time, costs and resources. Furthermore, if the analysis suggests a particular duration for a project, then adding extra time or funding (e.g. between 15% and 30%) would be useful later on. Also, on the one hand, in the event that there is a need for more time, then it is possible to take it from the tolerance fund. On the other hand, if there is no need for more time or funding, then the project would be considered to have been completed earlier and saved both time and cost.

> "In our plan, we consider adding 15% more time and cost, and we mention these as a tolerance of one just in case." (PM_10)

In the event of project escalation, the first thing that the IS project manager tends to do is temporarily pause working on the project, and then assess the situation. Furthermore, usually the developers are working on more than one project at the same time. Therefore, this temporary stop would give the team a chance to work on the other projects, instead of consuming it in the current escalated one. Later, after evaluating the escalation, and investigating the reasons, then the programmers can turn back to work in the project according to the new instructions.

> "The first thing is holding everything and stopping for a while to investigate the situation. Besides this will help to continue with other projects." (PM_26)

The project managers pointed out there is no such a universal solution for project escalation. Moreover, dealing with the situation depends on the circumstances of each challenge. For example, it is possible to solve it by adding more resources (e.g. programmers, hardware), or by reasonably extending the project time, or by paying for overtime to catch up with the plan. Thus, it could be the matter of a trade-off between time and cost. In addition, in the case of irresponsibly behaving staff (e.g. laziness, delays), the IS manager

will put more pressure and send warning letters, in order to control and deal with the situation

> "First you should find where the problem is, and what led this escalation. Then you can solve it." (PM_26)

> "On some occasions, paying the developers for over time helps to maintain their focus and deal with the situation. Yes it added more expense, but we managed the escalation." (PM_11)

> "There is no such thing as a universal solution, sometimes adding more resources can deal with the situation, or maybe by monitoring or warning the lazy programmers." (PM_16)

One possible way to deal with the situation is to split the project into smaller sub-projects based on a sequence of phases. Thus, the current project would be announced as first phase according to the original plan. Then, any other challenges will be transferred to the next phase, where dealing with them becomes easier, as there will be a new plan, budget, analysis, resources, and delivery date. Therefore, the current project may be considered as a completed one, not a failure or having been rejected. Besides, the new phases would start on a fixed base when it comes to dealing with all issues.

> "Splitting the project into smaller pieces is very useful, as dealing and controlling smaller projects is much easier. So, the current project is completed, and the next phase will have a new plan and budget which considers solving all the challenges that led to the escalation." (PM_3)

In the event that it is not possible to deal with the escalation, then the IS project manager should report and raise the situation with senior management. Furthermore, once senior management is involved, then it is possible to receive significant support such as solving all administrative issues, significantly increasing the budget, or hiring outsource workers to deal with the situation.

> "In the case where it is out of the project manager's control, then he should pass on the situation to senior management for them to take privileged action." (PM_12)

> "I request an outsourced professional who can deal with the situation. Lucky me, the higher management approved my request and paid for them." (PM_20)

> "I had no choice other than to report the problem with the database department to senior management. They kept our project struggling for like three months with no clear reason." (PM_15)

In addition, the interviewees mentioned senior management has the ability to make critical decisions which are outside of the IS project manager's privileges. For example, senior management may decide to reject the project and pay the fine, even in the case where the project progressed to reach a significant level of achievement (e.g. 80%), because the losses may be bigger in the event that the project continues. Besides, this may release the resources to work on other projects.

> "Once I received the approval from the higher management, I rejected the escalated project… maybe we completed 80%, but we saved a lot in comparison to the expected loss of it continuing, actually we freed valuable resource to work in other projects." (PM_19)

In another example, senior management may accept the escalation up to a specific level. This happens in order to offer a chance to complete the project, and in order to establish a significant relationship with the customer for the sake of future investments. However, it depends on the organisation's policies and strategic planning.

> "It depends on the organisation's polices and the views to future investment with the same customer. This rarely happens, but the higher management allowed escalating the project up to a certain level for the sake of future investment with the customer." (PM_12)

This is the end of the narrative. The next section will employ the technique of comparative analysis.

5.2.3 Comparative Analysis

The research sample includes 30 project managers from five different IS development organisations. A total of 18 interviewees are from D.L., an organisation which used to be a government unit but that has now successfully passed through a recent privatisation process. Another six interviewees are from K.U., a government organisation, and the remaining six interviewees from another three different private organisations.

For categorisation purposes, the D.L. organisation will represent one group as it has the highest number of interviewees, with 18 out of 30 project managers belonging to this group. The next group will be K.U. as it has the second highest number of interviewees, with six out of the 30 belonging to this organisation. The last group includes the other three organisations, N.B., Z.F. and B.L., with a total of six interviewees from these organisations. Table 5.5 provides more details about the three groups.

Table 5.5: Data Sample Categorisation

Group Name	Details
D.L.	It includes 18 project managers who belong to D.L. an organisation which passed through a recent privatisation process.
K.U.	It includes six project managers who belong to K.U. a government organisation.
Others	These include six project managers who belong to three different private organisations, namely N.B., Z.F. and B.L.

Source: Developed by the author

The following four Tables 5.6, 5.7, 5.8, and 5.9 summarise the themes which are mentioned by each group, after that comes the comparative analysis of these three groups.

Table 5.6: Summary of the Mentioned Theme by Each Group (1)

A. Knowledge Transfer			
Themes	**D.L.**	**K.U.**	**Others**
A.1 Factors facilitate knowledge transfer			
A.1.1 Knowing the Nature of Customer's Business			
- Choosing developers with experience	✓	✓	✓
- Train the developers	✓		✓
- Visiting customer's working place	✓	✓	✓
- Choosing project manager with experience	✓		✓
- The existence of similar products	✓	✓	✓
A.1.2 The Customer has a Technical Background			
- Choosing a representative with technical experience	✓	✓	✓
- Train the customer to use computer software	✓		
A.1.3 Identifying customer's knowledge source	✓	✓	✓
A.1.4 Setting greater focus on analysis	✓	✓	✓
A.1.5 Having effective communication with the customer	✓	✓	
A.1.6 Adopting ready-made solution	✓		
A.2 Knowledge transfer techniques			
A.2.1 Knowledge transfer methods			
- Forms and Questionnaires	✓	✓	✓
- Workshops	✓		✓
- JAD Sessions and meetings	✓	✓	✓
A.2.2 Knowledge transfer verification methods			
- Developing Process Model	✓		✓
- Developing Prototype	✓	✓	✓
- Documentation	✓		✓
- Acceptance and signing the contract	✓		✓
A.3 The effect of clear ideas and requirement			
A.3.1 More accurate planning, resources and time estimation	✓	✓	✓
A.3.2 Smoother Implementation	✓		
A.3.3 Reduces errors and later modifications	✓	✓	

Source: Developed by the author

Table 5.7: Summary of the Mentioned Theme by Each Group (2)

A. Knowledge Transfer				
Themes		**D.L.**	**K.U.**	**Others**
A.4	**Reasons behind unclear ideas and requirement**			
A.4.1	Customer is unable to clarify			
	- General idea with no details	✓	✓	✓
	- Unintentionally skip mentioning some points	✓	✓	✓
	- The level of customer education			✓
A.4.2	Customer's lack of communication	✓		
A.4.3	The Incompetency of customer's knowledge source			
	- Lack of business's experience to answer the inquiries	✓	✓	
	- Not in a position to make a decision	✓		
A.4.4	Customer's multiple knowledge sources contradictions	✓		✓
A.4.5	The customer keeps adding requirements	✓	✓	✓
A.4.6	Developers' inadequate analysis			
	- No enough time to gather the requirements	✓		✓
	- Lack of analytic experience	✓	✓	✓
A.4.7	The nature of IS development	✓	✓	✓
A.5	**The impact of unclear ideas and requirement**			
A.5.1	Increase in the cost, time and effort	✓	✓	✓
A.5.2	Product's poor quality	✓	✓	✓
A.5.3	Negligence when using the product	✓	✓	✓
A.5.4	Failure of the project	✓		✓
A.6	**Detecting unclear ideas**			
A.6.1	Review meetings with the customer	✓	✓	✓
A.6.2	Difficult implementation and programming	✓	✓	✓
A.6.3	Customer complains when testing the product	✓	✓	✓
A.7	**Dealing with unclear ideas**			
A.7.1	Identifying where the problem is	✓		✓
A.7.2	Meeting and verifying the situation with the customer	✓	✓	✓
A.7.3	Negotiating with the customer			
	- To not undertake the modifications	✓	✓	✓
	- To undertake some of the changes	✓		✓
	- To adjust the current project plan	✓	✓	✓
	- To undertake the changes in new release of the product	✓	✓	✓

Source: Developed by the author

Table 5.8: Summary of the Mentioned Theme by Each Group (3)

B. Project Escalation			
Themes	**D.L.**	**K.U.**	**Others**
B.1 Actors behind project escalation			
B.1.1 The Project Manager			
- Lack of experience and qualifications	✓	✓	✓
- Unidentified duties and responsibilities of the manager	✓		✓
- Poor relationship with developers	✓	✓	
B.1.2 The Developers			
- Learning new technology during working	✓		
- Educating the recent added staff about the project ideas	✓		
- Lack of a developer's experience and commitment	✓		✓
- Individual differences	✓		
B.1.3 The IS senior management			
- Lack of supporting the developers	✓		✓
- The existence of corruption and hidden agenda	✓		✓
- Overlapping functions within the managerial hierarchy	✓		✓
- Adding pressures in time and resources	✓		✓
B.1.4 The Customer			
- Customer has hidden agenda	✓		✓
- Lack of awareness in terms of developing and using IS products	✓		✓
B.1.5 Other parties	✓	✓	✓
B.2 Reasons behind project escalation			
B.2.1 Poor planning and operation			
- Inaccurate estimation for resource or task needed time	✓	✓	✓
- The actual progress does not comply with the plan	✓		✓
- Skip setting an emergency cover plan (Risk Analysis)	✓	✓	✓
B.2.2 Lack of human resources	✓		✓
B.2.3 Workload	✓	✓	✓
B.2.4 Unclear ideas	✓	✓	✓
B.2.5 Scope changing	✓	✓	✓
B.2.6 Project size is too large			
- Controlling becomes harder proportionally to project size	✓		✓
- Need for resources increases proportionally to project size	✓		✓

Source: Developed by the author

Table 5.9: Summary of the Mentioned Theme by Each Group (4)

B. Project Escalation				
Themes		**D.L.**	**K.U.**	**Others**
B.3	**Detecting project escalation**			
B.3.1	Project is monitored by third party	✓		✓
B.3.2	The later increase in customer's requirements	✓		✓
B.3.3	Comparing progress with project plan	✓	✓	✓
B.4	**Dealing with project escalation**			
B.4.1	Being prepared			
	- Focus more when planning	✓		✓
	- Use risk analysis	✓		✓
	- Assign more experienced project manager	✓	✓	✓
	- Add tolerance time and resources when planning	✓		✓
B.4.2	Pausing and assisting the situation	✓	✓	✓
B.4.3	Dealing with the challenges accordingly	✓	✓	✓
B.4.4	Splitting the project into sub-projects	✓	✓	
B.4.5	Involving senior management	✓		✓
B.4.6	Rejecting the project	✓		✓
B.4.7	Reasonably allowing escalation	✓	✓	✓

Source: Developed by the author

Analysis

At first sight, on the one hand it seems that the project managers from the D.L. organisation mentioned all the ideas covered in these themes. One of the possible reasons for this is the high number of the interviewees from this organisation, as it represents 60% of the sample, thus the likelihood of them covering more ideas is higher than in the other two groups.

On the other hand, the K.U. organisation got the lowest number of these themes, with 29 less than the D.L. organisation. However, there was no major difference within the construct of 'Knowledge Transfer'. Although the K.U. project managers did not talk about signing the contract or approving the requirements' document, which make sense in the light of the fact that it is a government organisation. This means they only provide their services internally within the unit and to the same organisation. So, it is the matter of receiving orders directly from these internal customers rather than signing

contracts. Furthermore, when checking the reasons behind ‘Project Escalation’, it was noticeable that the project managers from K.U. failed to mention the developers or IS higher management or the customer as responsible actors behind escalation. In addition, according to the K.U. responses, project size also has no impact on ‘Project Escalation’.

When checking the themes mentioned by the ‘Others’ group, it seems that there are no major differences when compared with the D.L. group, other than, when shedding light on the reasons behind unclear ideas, the people from the ‘Others’ group did not blame the customer for ‘lack of commitment and communication’, or for ‘incompetency of knowledge source’. In addition, the ‘Others’ group mentioned the ‘customer is unable to clarify his ideas’ as one of the reasons. So it seems that, in private organisations, the development team is stricter in terms of following the rules when it comes to gathering the requirements in the initial stage but not after that. This means that it is the customer’s responsibility to clarify the requirements in the beginning. The reason is that private development organisations do not allow changing or adding to the requirements later under the pretext of a lack of commitment or because the representative was not competent, particularly after generating the requirements’ document and signing the contract. So, this can be considered to be one of the main differences between the private organisations’ group ‘Others’ and the government organisation group, K.U.. In this regard, a project manager from a private organisation mentioned that:

> “The worst thing is that when you reach halfway in your project, then the customer changes his mind and adds more requirements. The problem is this customer does not respect the contract, and pretends these new requirements were mentioned in requirement document. As a project manager I would refuse a customer’s request, otherwise it would badly affect our progress.” (PM_30)

However, the reason of ‘keeps adding on-going requirements’ is mentioned by the ‘Others’ group, meaning that even in a private organisation the customer has the opportunity to do such a thing. Actually, this happens under certain conditions, such as

> "When it is the development stage and the customer asks to change some requirements, in this case we must inform the customer about the impact on cost and time.. Well, if he insists then he has to pay a fine and accepts the new plan and cost." (PM_23)

Another possible reason is the approval of IS higher management for the customer's new requirements. This point will be considered in more depth when discussing and designing the influence diagram which describes the relationship between the themes. Furthermore, when looking at the methods used to manage the 'Project Escalation' construct, one option is to reject the project which is better for the benefit of the private IS development organisations, whereas this solution was not available to the government organisation, K.U.

> "Sometimes, killing the escalated project is another success as it save us time and resources, so I can utilise them in progressing the project. As you know time is money." (PM_12)

5.2.4 Quantifying the data

It is possible to quantify the qualitative data in terms of the interviewees' responses, however this is not exactly as it is in the questionnaires. Furthermore, it can take the form of counting the frequencies and relationships among the data variables itself with respect to answers of the same inquiry. Moreover, it's possible to calculate it manually or by using specific computer programs (Mathie, 2005).

Therefore, in this stage of analysis, the data is quantified on the basis of the number of interviewees who mentioned each theme, for instance, out of 30, if 10 interviewees mentioned a certain theme (e.g. "Review Meetings with the Customer") then 33% of the sample supports this idea. Furthermore, in case there are sub-themes, the highest percentage will be counted to represent the main theme, for instance, if a certain theme has two sub themes with values of 13% and 10%, then the value of 13% will represent the main theme. Tables 5.10, 5.11, 5.12, and 5.13 provide more details.

Table 5.10: Quantifying Themes of: Construct (A) Knowledge Transfer (1)

Themes	Frequency N	Frequency %
A. Knowledge Transfer		
A.1 Factors facilitating knowledge transfer		
A.1.1 Knowing the nature of customer's business		
- Choosing developers with experience	3=	10%
- Train the developers	7=	23%
- Visiting customer's working place	12=	40%
- Choosing project manager with experience	2=	7%
- The existence of similar products	3=	10%
A.1.2 The Customer has technical background		
- Choosing a representative with technical experience	4=	13%
- Train the customer to use computer software	3=	10%
A.1.3 Identifying customer's knowledge source	12=	40%
A.1.4 Setting more focus on analysis	21=	70%
A.1.5 Having effective communication with the customer	14=	47%
A.1.6 Adopting readymade solution	1=	3%
A.2 Knowledge transfer techniques		
A.2.1 Knowledge transfer methods		
- Forms and questionnaires	9=	30%
- Workshops	3=	10%
- JAD sessions and meetings	16=	53%
A.2.2 Knowledge transfer verification methods		
- Developing process model	4=	13%
- Developing prototype	12=	40%
- Documentation	8=	27%
- Acceptance and signing the contract	6=	20%

Source: Developed by the author

Table 5.11: Quantifying Themes of: Construct (A) Knowledge Transfer (2)

Themes			Frequency N	Frequency %
A. Knowledge Transfer				
A.3	**The effect of clear ideas and requirement**			
	A.3.1	More accurate planning, resources and time estimation	17	57%
	A.3.2	Smoother implementation	21	7%
	A.3.3	Reduces errors and later modifications	3	10%
A.4	**Reasons behind unclear ideas and requirement**			
	A.4.1	Customer is unable to clarify		
		- General idea with no details	23	77%
		- Unintentionally skip mentioning some points	5	17%
		- The level of customer education	1	3%
	A.4.2	Customer's lack of communication	9	30%
	A.4.3	The incompetency of customer's knowledge source		
		- Lack of business's experience to answer the inquiries	14	47%
		- Not in a position to make a decision	3	10%
	A.4.4	Customer's multiple knowledge sources contradictions	8	27%
	A.4.5	The customer keeps adding requirements	17	57%
	A.4.6	Developers' inadequate analysis		
		- Not enough time to gather the requirements	5	17%
		- Lack of analytic experience	14	47%
	A.4.7	The nature of IS development	18	60%
A.5	**The impact of unclear ideas and requirement**			
	A.5.1	Increase in the cost, time and effort	14	47%
	A.5.2	Product's poor quality	5	17%
	A.5.3	Negligence when using the product	7	23%
	A.5.4	Failure of the project	3	10%
A.6	**Detecting unclear ideas**			
	A.6.1	Review meetings with the customer	10	33%
	A.6.2	Difficult implementation and programming	5	17%
	A.6.3	Customer complains when testing the product	10	33%
A.7	**Dealing with unclear ideas**			
	A.7.1	Identifying where the problem is	15	50%
	A.7.2	Meeting and verifying the situation with the customer	16	53%
	A.7.3	Negotiating with the customer		
		- To not undertake the modifications	6	20%
		- To undertake some of the changes	3	10%
		- To adjust the current project plan	3	10%
		- To undertake the changes in new release of the product	5	17%

Source: Developed by the author

Table 5.12: Quantifying Themes of: Construct (B) Project Escalation (1)

Themes		Frequency N	Frequency %
B. Project escalation			
B.1	**Actors behind project escalation**		
B.1.1	The Project Manager		
-	Lack of experience and qualifications	9=	30%
-	Unidentified duties and responsibilities of the manager	3=	10%
-	Poor relationship with developers	5=	17%
B.1.2	The Developers		
-	Learning new technology during working	1=	3%
-	Educating the recent added staff about the project ideas	4=	13%
-	Lack of a developer's experience and commitment	10=	33%
-	Individual differences	2=	7%
B.1.3	The IS senior management		
-	Lack of the developers support	10=	33%
-	In case of corruption, and the existence of hidden agenda	4=	13%
-	Overlapping functions within the managerial hierarchy	2=	7%
-	Adding pressures in time and resources	8=	27%
B.1.4	The Customer		
-	Customer has hidden agenda	9=	30%
-	Lack of awareness in terms of developing and using IS products	3=	10%
B.1.5	Other parties	7=	23%
B.2	**Reasons behind project escalation**		
B.2.1	Poor planning and operating		
-	Inaccurate estimation for resource or task needed time	6=	20%
-	The actual progress does not comply with the plan	4=	13%
-	Skip setting an emergency cover plan (Risk Analysis)	10=	33%
B.2.2	Lack of human resources	8=	27%
B.2.3	Workload	11=	37%
B.2.4	Unclear ideas	26=	87%
B.2.5	Scope changing	6=	20%
B.2.6	Project size is too large		
-	Controlling becomes harder proportionally to the project size	5=	17%
-	Need for resources increases proportionally to the project size	2=	7%

Source: Developed by the author

Table 5.13: Quantifying Themes of: Construct (B) Project Escalation (2)

Themes			Frequency N	Frequency %
B. Project escalation				
B.3	**Detecting project escalation**			
	B.3.1	Project is monitored by third party	5=	17%
	B.3.2	The late increase in customer's requirements	5=	17%
	B.3.3	Comparing progress with project plan	22=	73%
B.4	**Dealing with project escalation**			
	B.4.1	Being prepared		
		- Focus more when planning	8=	27%
		- Use risk analysis	5=	17%
		- Assign more experienced project manager	8=	27%
		- Add tolerance time and resources when planning	7=	23%
	B.4.2	Pausing and assessing the situation	17=	57%
	B.4.3	Dealing with the challenges accordingly	20=	66%
	B.4.4	Splitting the project into sub-projects	9=	30%
	B.4.5	Involving senior management	7=	23%
	B.4.6	Rejecting the project	5=	17%
	B.4.7	Reasonably allowing escalation	9=	30%

Source: Developed by the author

Analysis

A. Knowledge Transfer

Regarding the theme 'Factors facilitating knowledge transfer', the majority of the interviewees mentioned 'Setting more focus on analyses, making it the most frequently selected factor at 70%, which in turn reflects its importance. As mentioned before in the narrative, all the next steps will build on the requirements gathering and analysis stage, so spending sufficient time and effort at this stage to cover all the details is significant. Based on this, it is no wonder that the second, most frequently selected factor, is 'Having effective communication with the customer', at 47%. Transparent and efficient communication between the customer and the developers is, in itself, an activity of serious analysis which demonstrates the level of care with which each party must pass on ideas and clarify any vague points, confirming that there is a connection between this theme and the one mentioned before. The next theme is 'knowing the nature of the customer's business', with 40% of the

interviewees stating that this helps to establish a simple common understanding and to pave the way to better expectations. Another point is, that knowing about the customer's business may link with any experience which the project manager or developers may have in terms of any previous development done in that field. Moreover, pointing out any similar IS products may simplify the ideas to all parties. Furthermore, within this theme, 23% recommended training the developers and 40% said to send them to visit the customer's work place in order to gain actual experience. The less frequently selected factors are 'the customer has a technical background' and 'adopting a readymade solution' with 13% and 3% respectively. The reason behind these low counts is that:

> "... customer's activities and his business rules exist since the beginning. And this proposed computer software should assist him in his job and apply his rules at the same time, that's why I don't care that much for his ability to use computers. Actually we should convince the customer that our programs can help him in his job where he does not use any computer there." (PM_1)

In other words, it is a matter of developing a product which serves the customer's needs to improve productivity in the customer's organisation, at the same time as recognising that not all of these customers are experts in using computers; however, this is not a reason to reject them as customers. Furthermore, referring to the same point, it seems that not all readymade solutions will fulfil all of the customer's requirements; therefore it is better to develop a new IS product according to the customer's needs in the first place.

The next theme, 'Knowledge transfer techniques' describes the actual practice of transferring the knowledge between the customer and the developers. When looking at the 'knowledge transfer methods' it seems that the 'JAD session and meeting' is the most applied method with 53% of the interviewees selecting this. At the same time, this does not diminish the importance of completing 'forms and questionnaires', at the beginning it scored 30%. The least selected method is attending a 'workshop', at 10%, and the reason behind its unpopularity is that it depends on whether the customer can afford to host this workshop. Furthermore, the activities and discussions in

the JAD sessions which are organised by the developers should cover the benefits of a workshop.

The next theme is ‘Knowledge transfer verification methods’ and the Table 5.10 shows that 40% of the interviewees recommend ’developing a prototype’ as a useful method of verifying the customer’s transferred knowledge. In addition, almost a third 27% talked about the ‘documentation’ and 20% focused on ’acceptance and signing of the contract’. ‘Developing a process model’ scored 13%, because a number of the interviewees considered it as part of the prototype. The information provided in this theme will be used when developing a framework for managing knowledge in IS development, later in this chapter.

When talking about ‘The effect of clear ideas and requirements’, more than half of the interviewees 57% confirmed that it positively affects project planning in terms of the resources needed and time estimated for each task. In addition, two other effects are mentioned, ‘Smoother implementation’ and ‘Reduces errors and later modifications’, with selection rates of 7% and 10% respectively. In fact, the first effect seems to be the result of the last two, as the smooth implementation of coding leads to a lower number of issues in the code. The lower number of issues means less time and effort required to maintain them and the less time wasted serves to benefit the organisation’s commitment to the project time plan.

The next is one of the most interesting themes as it focuses on ‘Reasons behind unclear ideas and requirement’. There are several reasons, the most frequently selected of which is that ‘Customer is unable to clarify’, mentioned by 77% of the interviewees. In addition, there are other reasons which are the customer’s responsibility, namely ‘Customer’s lack of communication’ 30%, ‘The incompetency of the customer's knowledge source’ 47%, ‘multiple knowledge sources contradictions’ 27% and ‘The customer keeps adding requirements’ 57%. So, it seems that the customer’s attitude accounts for five out of seven reasons behind the knowledge transfer issue.

One of the other two reasons is ‘Developers’ inadequate analysis’ which reflects the responsibility of the developers, and it was selected by almost half of the sample 47% which suggest the importance of the developer role when it comes to elicit the requirements from the customer. Moreover, this issue may occur due to the project manager or developers’ lack of analytic experience or due to time pressures added by IS higher management, leaving insufficient time to gather and analyse the requirements.

The other reason is ’the nature of IS development’, which was selected by 60%. According to this reason, it is not exactly anyone’s fault, actually ‘unclear ideas’ are something normal and expected in this practice, because the developers are learning something new every time there is a customer from another business field. In addition, both customer and developers speak different languages relating to their own fields of work. Thus, misunderstanding and misinterpretation are to be expected in such a situation.

Following on from the previous theme, the next one is about ‘The impact of unclear ideas and requirement’. The first and most frequently selected result is the ’increase in the cost, time and effort’, mentioned by almost half of the interviewees 47%. Moreover, this impact reflects poor planning in terms of the increase in time and cost, in addition to poor operation and performance as it increases effort and workload. Furthermore, this result is a direct opposite to the result of clear ideas and requirements, which leads to more accurate planning. The second negative impact is the ‘Product’s poor quality’, which may lead to the third impact of ‘Negligence when using the product’, at 17% and 23% respectively.

Furthermore, in respect of the impact of unclear ideas, when looking at the reasons behind ’Project Escalation’ within the second construct, the most frequently selected reason is also ’unclear ideas’ with 87% of the interviewees mentioning it. This point will be discussed later in this chapter when discussing the reasons behind IS project escalation, in this respect this discussion is moved from here to avoid the duplication in the narrative.

The next theme focuses on ‘Detecting unclear ideas’, where about a third of the interviewees 33% said that it is possible to detect these issues through holding periodical review meetings with the customer. Another third 33% pointed out that this issue presents at ‘The customer complains when testing the product’. Only a few of them 17% mentioned ’Difficult implementation and programming’ as a possible sign of unclear ideas. The possible reason for this low frequency is that, logical problems and difficult implementation are so common issues. These issues may occurred for various of reasons, and not necessary because of unclear ideas.

Within the last theme in this construct ‘Dealing with unclear ideas’, the first sub-theme ‘Identifying where the problem is’ was mentioned by half of the sample as the first step to consider, which suggests it is the default reaction to such a situation. Then, 53% talked about ‘meeting and verifying the situation with the customer’ in order to ’negotiate the customer’ and make a reaction. In this respect, it looks like these people prefer ‘To not undertake the modification’, or ‘To undertake the changes in new release of the product’ in order to finish the project according to the original plan, as these two sub-themes scored 20% and 17% respectively. This is compared to the less preferred action ‘To undertake some of the changes’ or ‘To adjust the current project plan’ to do all the changes as they both scored 10%.

B. Project Escalation

The first theme in the second construct focuses on the ‘Actors behind project escalation’ and contains five actors. The first actor is the project manager with 30% of the interviewees mentioning his/her possible lack of experience and qualifications as a reason. Another reason might be if the project manager has a poor relationship with the rest of the developers. Moreover, what could make it worse is if this manager’s duties are unidentified, which may lead to the argument that it is not his/her responsibility. All these points impact negatively on the operation of the project because of the project manager’s attitude.

The second actor is the developer, with 33%, in that poor experience and lack of commitment may result from individual differences and combining working with learning activities at the same time.

The third actor behind project escalation is the IS senior management, as they may not be supporting the developers, as mentioned by 33% of the interviewees. Moreover, another problem that could have an impact is if the higher management is putting time and resource pressures on to the developers, or they are interfering with the project manager's duties which may have negative results due to the overlapping in the managerial hierarchy. Another serious problem in IS higher management is the possibility of managerial corruption at this level, which might give personal interests precedence over public interests.

The forth actor is the customer where this actor may have a hidden agenda, as mentioned by 30%. This means that the customer might be looking for other goals rather than project success, like resisting change by introducing this new IS product, or maybe satisfying other parties on the customer's side, or even trying to lead the project to fail in order to sign a contract with another IS organisation, due to corruption. Also, the customer's lack of awareness in developing and using IS products could be another reason.

The fifth actor encompasses any other parties who may be involved in project activities, as mentioned by 23%. This includes, for example, any out-sourcing, trainers or hardware installation people. As the IS project manager has no authority over these additional parties, then any delay or challenge occurred by them would impact on the project, e.g. the administrative issues created.

The next theme sheds light on six of the 'Reasons behind project escalation', where the first one is 'poor planning and operating' which was selected by 33%. Poor planning includes inaccurate estimation for resources or time needed for the task, in addition to failing to set an emergency cover plan. As a result of this, the actual progress will not be in line with the plan in terms of time or work achieved. There is no wonder that this leads to two other

reasons behind project escalation, namely ’Lack of human resources’ and ‘Workload’, at 27% and 37% respectively, because the development team needs more time, more effort and maybe more human resources to catch up with the original plan. Another reason which is mentioned by the majority of interviewees 87% is ‘Unclear ideas’. Considering the impact of this issue, as mentioned earlier, (i.e. poor planning and quality, increase in costs, time and effort) it seems that this issue has a serious negative impact on project operation and outcomes. The next reason is that ‘Scope changing’ is selected by 20%, which is the result of adding or changing requirements during the development stage and after the completion of the data gathering and analysis stage. The last reason is that the ‘project size is too large’, selected by 17%, which has impacts on the degree of difficulty of controlling the project and on the amount of resources needed, is that both of these increase in proportion to the project size.

The second main theme in the construct is ‘Detecting project escalation’. It seems that the majority 73% believe that ‘Comparing progress with the project plan’ is the preferred way, this is comparing to the other two ways of ‘Project is Monitored by Third Party’ and ‘The later increase in customer’s requirements’ as they both scored 17%.

The last main theme is ‘Dealing with project escalation, almost one third 27% advised ‘Being prepared’ since the beginning, in terms of being more focused when planning, considering risk analysis and adding tolerance time and resources to be ready if needed. Also, assigning a more experienced project manager is highly recommended. Then, in the case of project escalation, more than half 57% recommended ‘Pausing and assessing the situation’ in order to find out exactly where the problem is, in order to find a better way to deal with it. No wonder the next theme ‘Dealing with the challenges accordingly’ scored a relatively close frequency of 66%, in this respect, there is no such thing as a universal solution, since it depends on the circumstances and on the ability of the project manager to solve it accordingly, like adding more resources or warning the lazy developers. Another solution, which was mentioned by almost one third 30% is ‘Splitting the project into

sub–projects' which makes them easier to manage than the huge escalated one. However, in the case that the project manager is not able to handle the situation, then one possible solution is to 'Involving IS senior management' to take a privileged reaction. It seems this solution is not that preferable as it's mentioned by less than a quarter of the sample 23%, which suggest these IS projects manager are trying their best to deal with the situation before it becomes necessary to involve higher management. In this regards, it looks senior management tends more to 'Reasonably allowing escalation' comparing to 'Rejecting the Project' as they scored 30% and 17% respectively.

5.2.5 Sorting the Reasons behind Unclears Ideas and Project Escalation

The following Tables 5.14, 5.15, and 5.16 summarise and sort the reasons behind 'Unclear Ideas', and the cases and actors behind 'Project Escalation' according to the related themes' higher frequencies.

Table 5.14: Reasons behind Unclear Ideas Sorted by Higher Frequency

	Themes	Frequency
1.	Customer is unable to clarify	77%
2.	The nature of IS development	60%
3.	The customer keeps adding requirements	57%
4.	The incompetency of customer's knowledge source	47%
5.	Developers' inadequate analysis	47%
6.	Customer's lack of communication	30%
7.	Customer's multiple knowledge sources contradictions	27%

Source: Developed by the author

Table 5.15: Reasons behind Project Escalation Sorted by Higher Frequency

	Themes	Frequency
1.	Unclear ideas	87%
2.	Workload	37%
3.	Poor planning and operating	33%
4.	Lack of human resources	27%
5.	Scope changing	20%
6.	Project size is too large	17%

Source: Developed by the author

Table 5.16: Actors behind Project Escalation Sorted By Higher Frequency

	Themes	Frequency
1.	The developers	33%
1.	The IS senior management	33%
3.	The project manager	30%
3.	The customer	30%
5.	Other parties	23%

Source: Developed by the author

All in all, when looking at the reasons behind unclear ideas, it seems that the customer has a major effect with the highest frequency of selection at 77% in terms of the 'Customer is unable to clarify', in addition to being responsible for other reasons like 'The customer keeps adding requirements', 'The incompetency of customer's knowledge source', customer's lack of commitment and communication and 'multiple knowledge sources'. At the same time, the developer is responsible for the third most frequently selected reason of 'inadequate analysis' at 47%. One interesting thing is that 'the nature of IS development' was ranked second with 60%, where it is not exactly anyone's fault. However, blaming the nature of a practice is not an excuse, as experience should provide answers to the issue. In this regard, as mentioned by one of the interviewees:

> "There is a stage after completing the project, where we receive suggestions and gain the experience by studying the reasons of succeeding or failing, what challenges were faced and how to deal with them in the future. So we learn from our mistakes." (PM_12)

Another point, when checking the reasons behind 'Project Escalation', it's apparent that 'unclear ideas' scored the highest frequency of 87%. The next most frequently selected reason was 'Workload' with 37%, then 'Poor planning and operating' with 33%. Furthermore, according to the narrative of these three themes it seems that there is a relationship between them in terms of influence and effect. This point will be explained more in the section 5.2.6. Next, the reason of 'Project size is too large' had the lowest frequency of 17%. A possible reason for this score is that this is occurred in relation to the difficulty of managing and the need for more resources in which they both

proportionally increase to project size. In other words, this reason leads to the reasons of poor operating and lack of resources which scored 33% and 27% respectively. So, it seems these two reasons implied the effect of 'Project size is too large'.

One further point, in terms of the actors involved: the developers, the IS higher management, the project manager and the customer all scored close values of between 30% and 33%. In a way it seems they all equally share the responsibility when it comes to the reasons behind project escalation. Lastly, in order to understand how each of these factors and actors impact on each other, the next section will investigate the relationship between these themes in order to design an influence diagram.

5.2.6 The Relationships between the Themes

As presented in the themes, 'unclear ideas' is a common factor between the two main constructs, so it seems that there is a relationship between a number of the themes within these two constructs. The following Table 5.17 summarises the actors and reasons behind unclear ideas and project escalation.

Table 5.17: The Actors and Reasons Behind Unclear Ideas and Project Escalation

Reasons behind Project Escalation		Reasons behind Unclear Ideas
Actors	Reasons	Actors and Reasons
The project manager The developers The IS senior management The customer Other parties	Poor planning and operating Lack of human resources Workload Unclear ideas Scope changing Project size is too large	Customer is unable to clarify Customer's lack of communication The incompetency of customer's knowledge source Customer's multiple knowledge sources contradictions The customer keeps adding requirements The nature of IS development Developers' inadequate analysis

Source: Developed by the author

The following are the developed analysis Table 5.18 to identify the relationships between the themes in this stage of data collection.

Table 5.18: Identifying Relationships Between: the Reasons Behind Unclear Ideas and Project Escalation According to the Project Managers' Viewpoint

Key Theme	Evidence	Interpretation	Related theme
B.1.4 The customer	"One of our biggest problems is that the customer does not know what he wants. Usually he comes with general ideas, and skips some points unintentionally." (PM_7)	A.4.1 Customer is unable to clarify	B.2.4 Unclear ideas
	"It can't work with a customer who does not cooperate with us, ignoring our inquiries and skipping the meeting will not help to understand anything." (PM_3)	A.4.2 Customer's lack of communication	B.2.4 Unclear ideas
	"This misunderstanding happened because the person who gave us the requirements was not knowledgeable, and he was not the end user of the system." (PM_15)	A.4.3 The incompetency of the customer's knowledge source	B.2.4 Unclear ideas
	"The problem with multi-knowledge sources is that everyone gives information which contradicts others' information." (PM_1)	A.4.4 Customer's multiple knowledge sources contradictions	B.2.4 Unclear ideas
	"We suffer when the customer kept adding more and more requirements; this put us in a dilemma as they contradict with what they requested in the earlier stage of the requirements gathering." (PM_19)	A.4.5 The customer keeps adding requirements	B.2.4 Unclear ideas
	"These people have hidden agendas beyond project success…[it] kept the project opened, and badly exceeded its planed time and budget" (PM_16)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation
B.1.2 The developers	"These people have hidden agendas beyond project success. Because of this, they keep adding requirements for the sake of other people, and that kept the project open, and badly exceeded its planned time and budget." (PM_16)	A.4.6 Developers' inadequate analysis	B.2.4 Unclear ideas
	"So the programmer was busy in other part-time job and neglected working on the project." (PM_28)	B.2.1 Poor planning and operating	B.2 Reasons behind project escalation

Key Theme	Evidence	Interpretation	Related theme
B.1.1 The project manager	“Mis-estimating the time needed by the project manager led the project to escalate. This includes the project plan and all types of resources. So it affects one phase, which affects other phase, and so on. I blame the poor experience.” (PM_21)	B.2.1 Poor planning and operating	B.2 Reasons behind project escalation
	“Some developers and project managers do not ask enough questions when collecting user requirements, and make their own assumptions during the system design. This will eventually lead to conflict between the delivered system and the users’ expectations.” (PM_13)	A.4.6 Developers’ inadequate analysis	B.2.4 Unclear ideas
B.1.3 The IS senior management	“One of the senior managers set a short delivery time which didn’t fit with a big project like this one. Because of the pressure, we could not properly collect the requirements, and we needed 18 months instead of four weeks.” (PM_2)	A.4.6 Developers’ inadequate analysis	B.2.4 Unclear ideas
	“That person from the higher management forced us to work harder, accept all the major changes, and achieve the new requirements regardless of the consequences, which kept the project open for a long time… actually he was looking for personal credit at the expense of the escalation.” (PM_27)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation
	“Every day, three managers from different managerial levels were visiting my office and interfered with my duties to do the project according to their different needs and various viewpoints… I could not achieve anything with that project which lasted more than two years.” (PM_23)	B.2.1 Poor planning and operating	B.2 Reasons behind project escalation
	"Sometimes I feel like I am begging or fighting my manager for the resources. They should understand that, they should give me the needed resources, so I can give them back the software, otherwise nothing will be achieved." (PM_7)	B.2.2 Lack of human resources	B.2 Reasons behind project escalation
B.1.5 Other parties	“It happened because of the delay by an outside company which installed the hardware and trained us to use it.” (PM_4)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation

Key Theme	Evidence	Interpretation	Related theme
A.4.5 The customer keeps adding requirements	“We suffer when the customer kept adding more and more requirements; this put us in a dilemma as they contradict with what they requested in the earlier stage of the requirements gathering.” (PM_19)	B.2.4 Unclear ideas	B.2.4 Unclear ideas
	"We suffer from the new added requirements, particularly after completing the analysis stage, but these new requirements contradict the analysis outcome and open new doors which change the agreed scope." (PM_24)	B.2.5 Scope changing	B.2.5 Scope changing
B.2.6 Project size is too large	"The frequency of escalation happening depends on project size, as the size increases it becomes harder and exhausted to control a project." (PM_5)	B.2.1 Poor planning and operating	B.2 Reasons behind project escalation
	“The application was so big, and we all were busy at that time, so there was not enough man power to work in this application." (PM_2)	B.2.2 Lack of human resources	B.2 Reasons behind project escalation
	“Building a room is not like building a skyscraper. It is harder to control everything, besides the additional workload for working in big projects.” (PM_5)	B.2.3 Workload	B.2 Reasons behind project escalation
A.4.7 The nature of IS development	“Yes the developer knows about IS development, but every time they need to learn about human resources, marketing, finance … etc. I believe that it is challenging to learn a new business every day, and I can’t blame anyone for this.” (PM_5)	B.2.4 Unclear ideas	B.2.4 Unclear ideas
B.2.5 Scope changing	“Changing the scope meant modifying all the completed coding, and adding extra tasks to the original plan. So, with this additional workload it is difficult to keep the original plan or stay within the agreed budget, this means escalation is highly possible.” (PM_23)	B.2.3 Workload	B.2 Reasons behind project escalation
	“In one escalation occasion, the scope was not clear in the first place, and it did not include everything, so when it changed in the middle of the development stage, it felt like doing another brand new project which contradicted the original plan and budget.” (PM_19)	B.2.1 Poor planning and operating	B.2 Reasons behind project escalation

Key Theme	Evidence	Interpretation	Related theme
A.4.6 Developers' inadequate analysis	"Some developers and project managers do not ask enough questions when collecting user requirements, and make their own assumptions during the system design. This will eventually lead to conflict between the delivered system and the users' expectations." (PM_13)	B.2.4 Unclear ideas	B.2.4 Unclear ideas
B.2.4 Unclear ideas	"Dealing with these numerous problems because of unclear ideas adds additional cost and effort, besides the extra time to do it." (PM_29)	A.5.1 Increase in the cost, time and effort	B.2.1 Poor planning and operating
	"If you make general statements, the customer will come every day with new functions and requirements as descriptions for his unclear ideas." (PM_7)	A.4.5 The customer keeps adding requirements	B.2.4 Unclear ideas
B.2.1 Poor planning and operating	"The absence of risk management leads to escalation, where there is no cover plan, so any emergency can be an obstacle to the project and consume more time and effort to find a solution." (PM_19)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation
	"Two more developers were added to work on the project, because it was the project manager's mistake in terms of the required resources when planning." (PM_21)	B.2.2 Lack of human resources	B.2 Reasons behind project escalation
	"We underestimated the required time for this task as we thought it needed a week. Later in development phase we realised it took about a month, and this delayed other tasks, so we had to work longer hours every day to catch up with the schedule." (PM_4)	B.2.3 Workload	B.2 Reasons behind project escalation
B.2.2 Lack of human resources	"We suffer shortages in available developers, and this adds more pressure on those available to complete tasks." (PM_2)	B.2.3 Workload	B.2 Reasons behind project escalation
	"That one project escalated because of the shortage in human resources, under the pressure of multitasking, there was no enough time to finish the planned tasks, so we kept working for a very long time, which introduced additional cost as well." (PM_7)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation

Key Theme	Evidence	Interpretation	Related theme
B.2.3 Workload	"You can't focus when working on more than one project at the same time. This increases the workload and exhausts the developers, so more effort and additional time are highly expected, which leads to exceeding the original plan." (PM_5)	B.2 Reasons behind project escalation	B.2 Reasons behind project escalation

The following will discuss the relationship between the themes in more detail. Number of the relationships between these themes or theoretical components are discussed earlier in this section within the narrative as they were identified through the axial coding. The following will discuss and focus on the relationship according to the theoretical coding, starting from the independent variables and the mediating variables as clarified in the previous chapter in Figure 4.4. In order to facilitate the discussion, the theme 'Reasons behind unclear ideas and requirements' from construct (A: Knowledge Transfer) will be referred as 'Unclear ideas' from the construct (B: Project Escalation), particularly they both represent the same meaning.

● Independent Variables

- The Project Manager and the Developers

The data analysis suggested both of these actors share a number of reasons regarding 'unclear ideas' and 'Project Escalation'. First, both of them are responsible for 'inadequate analysis' and a lack of analytical experience may lead to 'unclear ideas'.

> "The developers and I faced problems when gathering the requirements, actually at that time we were not so professional to retrieve these requirements from the customer." (PM_12)

Furthermore, according to the interviewees, the attitude of the project manager and the developers had an impact on 'project planning and operating'. As an example, the developer's lack of commitment and the project manager's lack of experience may have created an obstacle to the flow of the project operation. This may affect the amount of work achieved compared to the time schedule, or making the right decisions in the case of challenges. The project manager should set the project plan in consultation with the developers, thus these two are at blamed for the poor planning and project operation..

> "From the developers' side there are a lot of expected and unexpected problems, like wasting time and not coding, besides they do not commit to the time plan." (PM_21)

> "Mis-estimating the time needed by the project manager led the project to escalate. This includes the project plan and all types of resources. So it affects one phase, which affects other phase, and so on. I blame the poor experience." (PM_21)

- The IS senior management

The data analysis suggested that like the project manager and developers, the IS senior management may negatively affect the analysis stage by adding time pressures. This result in not be enough available time to gather and interpret customers' requirements, leading to an inadequate analysis.

> "In responding to customer's request to finish this project ASAP, our higher management pushed on us to do the analysis and development sooner. Honestly there was no time to analyse or even to gather the requirements." (PM_17)

Furthermore, sometimes this actor interferes with the project manager's duties and gives contradictory instructions which unhelpfully impacts on project plans and goals; the result of this overlapping in managerial hierarchy leads to poor planning and operation.

> "Every day, three managers from different managerial levels were visiting my office and interfered with my duties to do the project according to their different needs and various viewpoints… I could not achieve anything with that project which lasted more than two years." (PM_23)

Also, according to the interviewees, as well as failing to support the developers, the IS senior management may not allow sufficient resources, and that lack of resources will have another unfortunate influence on the project.

> "Sometimes I feel like I am begging or fighting my manager for the resources. They should understand that, they should give me the needed resources, so I can give them back the software, otherwise nothing will be achieved." (PM_7)

The existence of a hidden agenda due to managerial corruption is another way in which this actor's attitude may lead to 'Project Escalation'. For example, due to an affair between the senior management and the customer, all

the additional customer requirements are given approval by senior management, leading to ‘Project Escalation’.

> “It could be the corrupted working environment, where the customer exploits the relationship with higher management to keep the project open and add more requirements every day, so we are the eventual victims.” (PM_2)

- Other parties

According to the interviewees, the ‘Other parties’ includes, for example, any out-sourcing, trainers or hardware installation people. As the IS project manager has no authority over these other parties, then any delay or challenge occurred by them have an impact on the project, e.g. with administrative issues.

> “One of the most important reasons is the delays because of other departments involved in the project.” (PM_13)

- The Customer

As mentioned earlier in the narrative by the interviewees, the customer is responsible for a number of the reasons behind ‘Unclear ideas’. This includes, for example, the lack of detail, insufficient answers to any query regarding the customer’s business, contradictory knowledge sources and the absence of some knowledge sources.

> “One of our biggest problems is that the customer does not know what he wants. Usually he comes with general ideas, and skips some points unintentionally.” (PM_7)

Moreover, this customer seems to have had a direct impact on ‘Project Escalation’ because of the existence of a hidden agenda where this customer was looking for goals other than the project’s success.

> “I found what the problem was, the customer was failing the test every time on purpose. Because this customer resisted the change of introducing this

> computer software. So as the customer has other hidden goals, this put us in jam and escalated the project for no clear reason." (PM_27)

● Mediating Variables

- The customer keeps adding requirements

The interviewees responses suggested that another impact is keeping adding on-going requirements. So, the customer keeps adding to or changing the requirements during the development stage. Doing this may challenge some points of the gathered requirements in the first stage. Thus, it leads to the situation of unclear ideas. Also, it could lead to expanding or changing the scope of the project.

> "We suffer when the customer kept adding more and more requirements; this put us in a dilemma as they contradict with what they requested in the earlier stage of the requirements gathering." (PM_19)

> "We suffer from the new added requirements, particularly after completing the analysis stage, but these new requirements contradict the analysis outcome and open new doors which change the agreed scope." (PM_24)

- Project Size is Too Large

According to the data analysis, project Size has an impact on the level of difficulty of controlling the project, which affects the project's operation as it becomes harder and workload increases. Furthermore, as the need for resources increases proportionally to the project size, this may lead to a lack of support if f the availability of human resources is an issue..

> "The frequency of escalation happening depends on project size, as the size increases it becomes harder and exhausted to control a project." (PM_5)

> "Building a room is not like building a skyscraper. It is harder to control everything, besides the additional workload for working in big projects." (PM_5)

> "The application was so big, and we all were busy at that time, so there was not enough man power to work in this application." (PM_2)

- The nature of IS development

As previously pointed out by the interviewees, due to the nature of IS development both the customer and the developers speak different languages within their different fields of work. Thus, the developer may misinterpret something said by the customer, so the unclear ideas can be expected.

> "What do you expect from two people who speak different business languages? It is natural to get a situation of misunderstanding in this practice." (PM_7)

- Scope changing

According to the project managers, changing the scope of the project has implications; it requires a number of changes and alterations in the programming code and completed tasks. Furthermore, some of these modifications may be major ones and require more time and effort to be spent. Also, the increase in workload to modify written code is much harder than starting from the beginning.

> "Changing the scope meant modifying all the completed coding, and adding extra tasks to the original plan. So, with this additional workload it is difficult to keep the original plan or stay within the agreed budget, this means escalation is highly possible." (PM_23)

- Developers' inadequate analysis

This has a direct impact and leads to the situation of unclear ideas as suggested by the data analysis.

> "Some developers and project managers do not ask enough questions when collecting user requirements, and make their own assumptions during the system design. This will eventually lead to conflict between the delivered system and the users' expectations." (PM_13)

- Unclear Ideas

One of the effects of ‘unclear ideas’ is that it leads to ‘poor planning and operating’. This means, as the project plan is built on an inaccurate basis of knowledge, then dealing with ‘unclear Ideas’ negatively impact on the plan and the achieved progress, in terms this dealing requires an increase in time, cost, and efforts.

> “It is too late to deal with unclear ideas in the development stage. The plan and resources are set already. And it is really hard to make any changes now as it cost us to add more time and efforts. Actually, this will badly impact on project plan and running” (PM_14)

Moreover, if the initial ideas are vague and unclear, then adding further requirements under the pretext of explaining these ideas is likely to occur.

> “If you make general statements, the customer will come every day with new functions and requirements as descriptions for his unclear ideas.” (PM_7)

- Poor Planning and Operating

As reported by the project managers, some of the expected results of ’poor planning and operating’ are the delay in progress and the accumulation of uncompleted tasks. This can lead to an increase in the ’workload’ in order to compensate for the delays in the schedule.

> “We underestimated the required time for this task as we thought it needed a week. Later in development phase we realised it took about a month, and this delayed other tasks, so we had to work longer hours every day to catch up with the schedule.” (PM_4)

Another result is the need for more resources, as inaccurate estimates during the planning stage can lead to a ’lack of resources’ during the development stage.

> “Two more developers were added to work on the project, because it was the project manager’s mistake in terms of the required resources when planning.” (PM_21)

Another point is that the absence of establishing a cover plan or conducting a risk analysis may put the project in an unfortunate situation when faced with unexpected challenges.

> "The good project manager must consider the risk analysis when planning for a project, because without preparation the project will struggle at any unexpected challenge." (PM_16)

- Lack of human resources

As previously highlighted by the interviewees, a shortage in resources may hinder the work flow until resources become available, particularly if this shortage is expertise of IS development (e.g. a new-technology expert). Furthermore, in the event that there are only a limited number of dedicated developers for one project, this creates the need to assign more tasks to each developer and this can lead to an increase in 'workload'.

> "The rare expert of SAP in the world was not free to serve us in that time, so we had to wait for him." (PM_5)

> "We suffer shortages in available developers, and this adds more pressure on those available to complete tasks." (PM_2)

- Workload

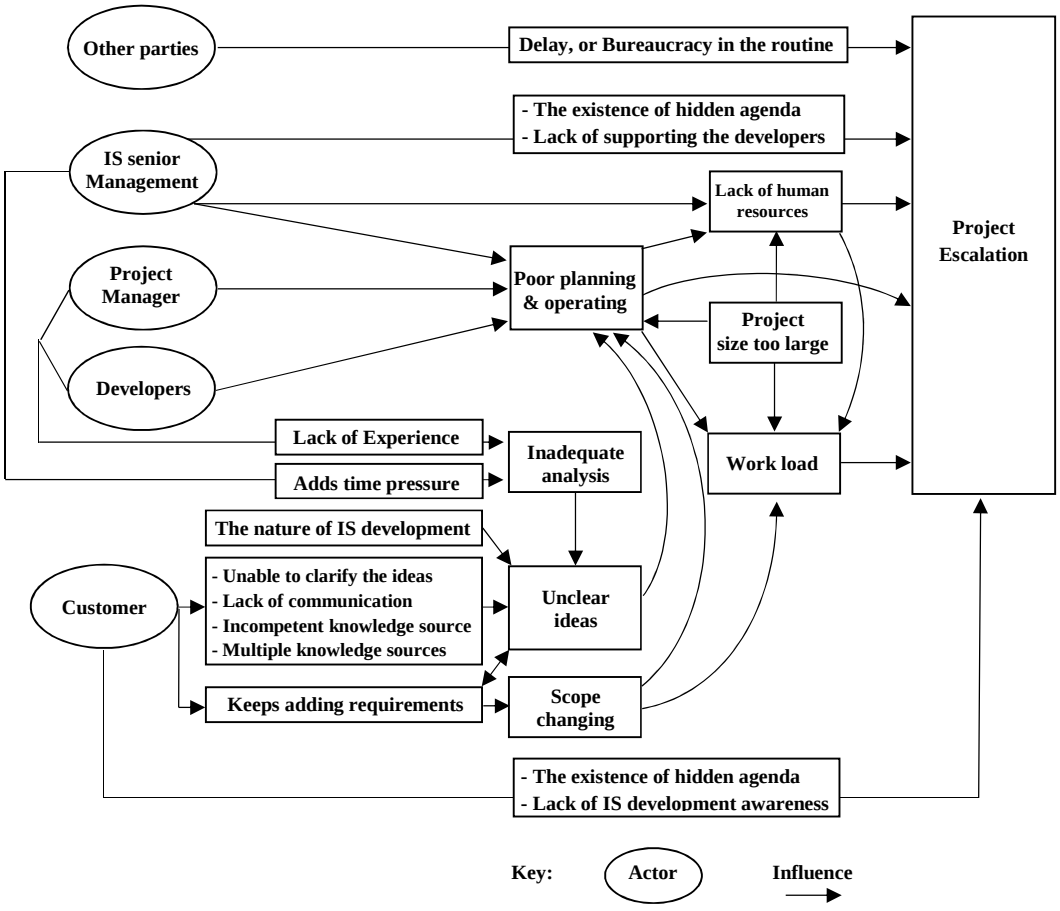
As explained by the project managers, the effect of workload on developers, in terms of exhaustion and the negative impact on productivity, increases the number of code errors and the effort required to deal with them. Therefore, such impacts can keep the project running for longer and increase costs.

> "You can't focus when working on more than one project at a time. This increases the work load and exhausts the developers, so more efforts and additional time is expected, which leads to an in increase in time and costs." (PM_5)

5.2.7 Drawing Influence Diagram

Based on the recent discussion of the relationship between themes and taking into consideration the guidance of the Enhanced Framework to Address the First Research Aim in Figure 4.4, the following diagram in Figure 5.1 has been created.

Figure 5.1: Influence Diagram of the Relationship between the Reasons Behind Unclear Ideas and IS Project Escalation According to the IS Project Managers' Viewpoint



Source: Developed by the author

This diagram summarises all the relationships between the reasons behind unclear ideas and project escalation.

When comparing the diagram in Figure 5.1 to the Enhanced Framework to Address the First Research Aim in Figure 4.4, it looks both of them has the same structure in terms of the following. First, the actors are lined up on the left of the diagram in which they represents the independent variables. Second, the mediating variables of Project Management and Knowledge Transfer are located in the middle of the diagram. However these variables are represented by the theoretical components of 'Poor planning and operating' and 'Unclear ideas' respectively in the developed diagram in Figure 5.1. Third, a number of suggested relationships between the variables in the framework in Figure 4.4 are identified in more details in the developed diagram in Figure 5.1. For instance, the relationships of the project manager, developers with project management, and the relationships of the customer with knowledge transfer. However, the developed diagram in Figure 5.1 introduced a number of indirect relationships between the variables. This point will be discussed later in this section. Moreover, the mediating variables in the framework in Figure 4.4 have a number of related theoretical components in the diagram in Figure 5.1. For example, Project Management variable is related to 'Lack of human resources', 'Workload', and 'Project size is too large'. Another example, Knowledge Transfer variable is related to 'Inadequate analysis', 'Keeps adding requirements', and 'The nature of IS development'. Furthermore, the diagram in Figure 5.1 presented two additional independent variables, namely 'Project size is too large' and 'The nature of IS development'. Thus, the diagram in Figure 5.1 has richer details and more sophisticated relationships, as this diagram in Figure 5.1 is developed and guided by the illustration of the framework in Figure 4.4.

When focusing on the developed diagram in Figure 5.1, it looks as though the boxes for 'unclear ideas' and 'poor planning and operating' are the centralised ones in this diagram, with nine arrows attached to the first one, and five arrows attached to the second one. Furthermore, the reasons of 'poor planning and operating' were influenced by the majority of other reasons, at the same time it has a direct impact on project escalation. Also, 'poor planning and operating' impacts on two other reasons namely 'lack of resources' and

workload' in which they both directly lead to project escalation. This supports the significant impact of 'poor planning and operating' as a critical factor with respect to project outcomes.

Regarding the reasons of 'Unclear ideas' and 'Customer keeps adding requirements' these mutually impact on each other as previously uncovered. When we consider that adding more requirements can change the project scope, this suggests 'Unclear ideas' leads to an indirect change in the scope. Through applying the same concept of indirect impact, it seems 'Unclear ideas' has more impact than the other reasons. Additionally, the 'Unclear ideas' directly impacts on 'Customer keeps adding requirements' and 'poor planning and operating. In addition, it has a further indirect impact on 'Scope changing', 'Workload', and 'Lack of human resources'. This reflects its critical role with respect of being a reason behind project escalation.

Regarding the actors, on one hand it seems that the project manager and developers have an indirect effect on 'Project Escalation' in terms of their responsibilities for 'inadequate analysis' and 'poor planning and operating'. On the other hand, both the IS higher management and the customer can have a direct impact on 'Project Escalation'. Furthermore, these direct impacts seem to be related through the customer's attitude, in terms of the possible existence of a hidden agenda receiving approval from the IS higher management. Also, the boxes for the nature of IS development' and 'project size too large' have neither earlier reasons nor actors behind them as the first one is the about of the nature of IS development itself and the second one is a fact of the project.

Throughout the three types of analysis conducted (comparing, quantifying and detecting relationships), it seems that the issues of 'Knowledge Transfer' are mentioned by a number of the interviewees in each organisation. Moreover, the quantifying analysis shows that 'unclear ideas' achieved the highest frequency of selection among all themes and ideas (86%). Then, in the influence diagram in Figure 5.1, the box for 'unclear ideas' is a central one, and it leads to another centralised box, 'poor planning and operating'. Therefore, this suggests that the matter of knowledge transfer is a crucial factor

within the practice of IS development according to the IS project manager's viewpoint.

This is the end of the analysis of the first stage of data collection.

5.3 Conclusion

This chapter highlighted the empirical research stage, in terms of presenting the data analysis and the resulted outcomes of the first stage of data collection. In which, this data considered the IS project manager's responses. The chapter started by identifying the main constructs and themes. Then, a narrative which summarises and links the research concerns and interviewees' answers is generated. After that, the analysis involved a number of techniques like theoretical coding, comparing and quantifying the data. Later, an influence diagram which clarifies the relationships between the actors and reasons behind unclear ideas and project escalation is developed.

The next chapter will analyse the data of the second stage of data collection. In which this data represents the viewpoint of a number of customer with respect to knowledge transfer and project escalation in IS development projects.

Chapter 6: The Analysis of the Second Stage of Data Collection

6.1 Introduction

The previous chapter analysed the data of the first stage of data collection, in which that data represents the perspective of IS project managers towards knowledge transfer and project escalation in IS development projects.

This chapter will consider the viewpoint of the customer, and analyse the data of the second stage of data collection. Furthermore, this chapter concerns the reasons behind and the relationship between the challenges of project escalation and unclear ideas, thus it focuses on the first aim of this research.

6.2 The Analysis of the Second Stage of Data Collection

In the second stage, the data was collected by holding semi-structured interviews with 10 customers from seven different Saudi organisations in Saudi Arabia. Considering managing and running the project is the duty of the project manager and the developers, it was not expected to retrieve sophisticated details from the customer regards the challenge of project escalation. However, the majority of the customers showed a high level of understanding regards such a challenge. At the same time, this understanding did not report the involvement with extreme escalation situation as mentioned in the literature (i.e. Keil, 1995), For example:

> "Up to my knowledge, in such a situation of escalation, there will be a huge delay to deliver the final product for no clear reason. In which it accompanied with a critical increase in the budget. Of course, this awful situation was not expected at all when signing the contract" (Customer_2)

The following will describe in more detail each step of the analysis process.

6.2.1 Main Themes and Constructs

The first round of the analysis aimed to identify the main themes of the data, in addition to figure out the relationships between the themes and sub-themes. So the analysis began by using Open Coding and Axial Coding. As a result, the first draft of the outcome contained 12 themes within two general constructs. Then, after one more round of refinements, which focused on selecting the more relevant themes and merging similar categories, it ended with eight main themes within two general constructs. These constructs and themes were derived from the data literature, and guided by the main aspects of the research as follows.

Construct (A'): Knowledge Transfer

According to the customers' viewpoint, this construct discovered the process of knowledge transfer with respect to the customer's requirements. Moreover, it discussed a number of the challenges which may obstruct the knowledge flow process. This construct describes a customer's replies with what the project manager mentioned regards as the impact of customers on the issue of unclear ideas.

Construct (B'): Project escalation

In this construct, the issue of project escalation is discussed, according to the viewpoint of the customers, in terms of the reasons behind it, and how to respond when dealing with it, according to the customer's viewpoint. The construct describes customer's replies with respect to what the project manager regards as the impact of customers on the issue of project escalation.

Tables 6.1 and 6.2 provide more details about the themes and their subthemes.

Table 6.1: The First Construct and its Themes

Construct (A'): Knowledge Transfer
A'.1 Knowledge transfer process A'.1.1 Collecting and submitting initial requirements A'.1.2 Conducting various styles of meetings to cover the details A'.1.3 Developing a prototype A'.1.4 Generating and verifying the requirements document A'.1.5 Confirming the requirements by signing the contract
A'.2 Reasons behind unclear ideas and requirements A'.2.1 The nature of IS development A'.2.2 Requirements' lack of details A'.2.3 Poor analysis A'.2.4 Inaccurate expectation A'.2.5 Being tricked by developers
A'.3 Dealing with unclear ideas and requirements A'.3.1 Meeting and verifying the situation with the developers
A'.4 Replies for customer's responsibilities for unclear ideas A'.4.1 Reply for: Customer is unable to clarify A'.4.2 Reply for: The incompetency of knowledge source A'.4.3 Reply for: Customer's multiple knowledge sources A'.4.4 Reply for: Customer's lack of communication A'.4.5 Reply for: The customer keeps adding requirements

Source: Developed by the author

Table 6.2: The Second Construct and its Themes

Construct (B'): Project Escalation
B'.1 Actors behind project escalation B'.1.1 The developers B'.1.2 The customer **B'.2 Reasons behind project escalation** B'.2.1 IS development lack experience B'.2.2 Poor planning B'.2.3 Inaccurate progress reporting B'.2.4 Poor contract B'.2.5 Unclear ideas B'.2.6 Scope and Deadline changing **B'.3 Dealing with project escalation** B'.3.1 Accepting the situation and continue B'.3.2 Allowing certain escalation (10%-40%) B'.3.3 Rejecting the project **B'.4 Replies for customer's responsibilities for project escalation** B'.4.1 Reply for: The customer has a hidden agenda beyond project success B'.4.2 Reply for: Lack of awareness in terms of developing and using IS products B'.4.3 Reply for: The customer changes the project's scope

Source: Developed by the author

The following are the developed analysis Tables 6.3 and 6.4 during this stage of analysing the data.

Table 6.3: Identifying Themes of: Construct (A') Knowledge Transfer

Key Theme	Evidence	Interpretation	Related theme
A'.1 Knowledge transfer process	"In the beginning we collected our brief requirements, and then wrote these in the (request for proposal form). Later we sent this form to the development people." (Customer_01)	A'.1.1 Collecting and submitting initial requirements	
	"During these meetings we brainstorm, and discuss what we want in the computer program, alongside the expected business process." (Customer_03)	A'.1.2 Conducting various styles of meetings to cover the details	
	"Through reviewing the sequence of these prototypes' screens on the computer, I can easily point out the problems." (Customer_09)	A'.1.3 Developing a prototype	
	"We worked together to write the business requirements document. So they described everything and then I corrected their mistakes." (Customer_05)	A'.1.4 Generating and verifying the requirements document	
	"Signing the contract means we've approved the requirements document, and given the signal to start the project." (Customer_05)	A'.1.5 Confirming the requirements by signing the contract	
A'.2 Reasons behind unclear ideas and requirements	"This is normal in these projects, because people aren't working in the same profession, so they may not understand everything we say." (Customer_02)	A'.2.1 The nature of IS development	
	"I think they didn't understand us because of our lack of experience when it came to teaching our business concepts." (Customer_01)	A'.2.2 Requirements' lack of details	
	"The requirement gathering took less than a day, and they didn't gather enough information. Actually, we have been tricked by their low level of analysis." (Customer_09)	A'.2.3 Poor analysis	
	"They did not create a prototype, this is why we faced a lot of problems later." (Customer_06)	A'.2.4 Inaccurate expectation	

Key Theme	Evidence	Interpretation	Related theme
A'.2 Reasons behind unclear ideas and requirements	"They gave me a fake response that made me think they understood but the truth was later revealed.." (Customer_06)	A'.2.5 Being tricked by developers	
A'.3 Dealing with unclear ideas and requirements	"I can point out any challenge with requirement during monthly review meetings when we discuss the progress. Or maybe when testing the final release of the IS product. So in case there were unclear or missing requirements, then we should meet the developers to check the requirement document, and to arrange to fix the code to deal with this problem" (Customer_10)	A'.3.1 Meeting and verifying the situation with the developers	
A'.4 Replies for Customer's responsibilities for unclear ideas	"Our business roles are difficult to teach" (Customer_05) "Excuse me, this is the developers' job to collect the requirements, not mine." (Customer_06)	A'.4.1 Reply for: Customer is unable to clarify	
	"Yes it happened twice, what happened is that my manager took the decision and filled the forms during the meeting without consulting us." (Customer_02)	A'.4.2 Reply for: The incompetency of knowledge source	
	"I am a busy man, I can barely finish my work here. So how can I reply to their random phone calls?" (Customer_01)	A'.4.3 Reply for: Customer's multiple knowledge sources	
	"This happens due to the mis-coordination between internal departments." (Customer_03)	A'.4.4 Reply for: Customer's lack of communication	
	"The business has its own changes every day, which in turn forces us to change current systems to continue, particularly with the emergent changes." (Customer_07)	A'.4.5 Reply for: The customer keeps adding requirements	

Table 6.4: Identifying Themes of: Construct (B') Project Escalation

Key Theme	Evidence	Interpretation	Related theme
B'.1 Actors behind project escalation	"Creating this IS product is the responsibility of us and the developers. So we are all blamed for the escalation problem" (Customer_09)	B'.1.1 The Developers	
		B'.1.2 The Customer	
B'.2 Reasons behind project escalation	"They literally tricked us. They never committed to the schedule nor respected the deadline. So our project was kept open for longer, and that delay cost us a lot." (Customer_05)	B'.2.1 IS development lack experience	
	"… they increased the working time and later added more programmers and computers … actually I told them to be more careful when they set their project plan." (Customer_06)	B'.2.2 Poor planning	
	"If we knew how to write these computer programs, they would not be able to mislead us by fake progress reports" (Customer_07)	B'.2.3 Inaccurate progress reporting	
	"During the meeting we received a lot of verbal promises from the analyser with respect to our requirements, later we were surprised at these promises weren't included in the contract.." (Customer_06)	B'.2.4 Poor contract	
	"In this type of project, it is commonly known that a situation of unclear ideas is highly expected, so we won't be surprised for additional increases in time or cost." (Customer_05)	B'.2.5 Unclear ideas	
	"This maybe happened because we changed the scope at the last minute, and this required major and rooted changes … without these changes we will would be able to issue e-tickets for the airline companies." (Customer_04)	B'.2.6 Scope and Deadline changing	

Key Theme	Evidence	Interpretation	Related theme
B'.3 Dealing with Project Escalation	"Unfortunately we had to continue, because we had a better chance of completing the project instead of hiring another vendor." (Customer_02)	B'.3.1 Accepting the situation and continue	
	"I was prepared and requested 7,000 additional working hours in advance, which is 40% more time, just to be in case." (Customer_06)	B'.3.2 Allowing certain escalation (%10-%40)	
	"… enough wasting our time and our money, killing this out of control project is necessary here." (Customer_07)	B'.3.3 Rejecting the project	
B'.4 Replies for Customer's responsibilities for Project Escalation	"I can't find any justification for such an irresponsible attitude… hiring a consulting or observational party may limit this unacceptable attitude." (Customer_04)	B'.4.1 Reply for: The Customer has hidden agenda beyond project success	
	"Please, this is the fault of their project manager. He didn't tell me about the negative effects, and kept accepting my new requests." (Customer_04)	B'.4.2 Reply for: Lack of awareness in terms of developing and using IS products	
	"The business has its own changes every day, which in turn forces us to change current systems to continue, particularly with the emergent issues." (Customer_07)	B'.4.3 Reply for: The customer changes project's scope	

6.2.2 Narrative

This time the narrative summarises and links the research concerns and customers' answers. In the following, the narrative will be presented based on the customers' viewpoint.

A'. Knowledge Transfer

● *A'.1 Knowledge Transfer Process*

According to the customers, the process usually starts by collecting the requirement internally at the customer's organisation, through the people who need the IS product or perhaps with the help of the internal IT department. The requirements, which represent general needs with almost no detail, are written into a form or template (e.g. Initial requirements form, or Request for proposal form) in preparation for submission to the IS development organisation.

> "In the beginning we collected our brief requirements, and then wrote these in the (request for proposal form). Later we sent this form to the development people." (Customer_01)

Next, the customers mentioned that after receiving the general requirements, the developers conduct a number of meetings in various styles with the customer. These involve long discussions and brain storming to help gaining a better understanding and more details and to also cover more features of the proposed IS product. Sometimes the customer may host the meeting and organise a workshop to explain more about the nature of a customer's business. Additionally, the developers can spend reasonable time and witness a customer's work in real time which may increase the chances of understanding the customer's ideas and requirements.

> "During these meetings we brainstorm and discuss what we want in the computer program, alongside the expected business process." (Customer_03)

> "We present on our company and our profession during this workshop." (Customer_06)

> "Usually I ask the developer to visit us and see how we work. From experience this will help them to understand our requirements." (Customer_01)

In the case where the developers have had previous experience in the same business field as the customer, this may significantly aid the requirements elicitation process

> "I like working with these development people. We've worked together before and they know exactly what I am talking about." (Customer_04)

> "They had a very good familiarity with my job. So they better understood the requirements." (Customer_02)

Later, the developers create a prototype based on their understanding, or maybe by using interfaces sketches which provided by the customer in case these sketches are available. This prototype shows the expected user interface and screen designs for the proposed IS product. Customers generally consider this prototype as a significant method to verify the requirements clearance from both sides. Furthermore, with each meeting, the customer's comments and notes are considered by the developer. So, based on the customer's response, an improved version of the prototype is created for the next review meeting. In such meetings the progress of the achieved work and the faced challenges should be reported by the developers to the customer.

> "During the meeting we draw some sketches for the user screens. So in the next meeting they will create a prototype based on our sketches and notes." (Customer_04)

> "I liked the discussing the prototype. So I knew exactly what I will get later on." (Customer_05)

> "Through reviewing the sequence of these prototypes' screens on the computer, I can easily point out the problems." (Customer_09)

> "We see an improved version of the prototype based on our comments during the periodical review meetings as in these meetings we discuss the project's progress and problems, which includes our comments regarding the prototype. By doing this it helps to verify the requirements." (Customer_07)

Next, the developers write down all the expected requirements and support these by including the prototype in order to generate the requirements' documents. It's then the customer's responsibility to review this document, in terms of verifying or modifying the included process and details.

> "This document includes everything, like the screen design, business process, and printed pages from the prototype as well." (Customer_07)

> "We worked together to write the business requirements document. So they described everything and then I corrected their mistakes." (Customer_05)

Once the requirements' document is finalised, it's now time to sign the contract and commit to the agreed specified requirements. Additionally, this contract may include the project stages, cost, time plan, deadline, and any further maintenance or support arrangements.

> "Signing the contract means we've approved the requirements document, and given the signal to start the project." (Customer_05)

> "It's not just the requirements that are included in the contract. There is also the project timeline, project stages, the monthly instalments and the training plan." (Customer_10)

● *A'.2 Reasons behind unclear ideas and requirements*

According to the customer's viewpoint, there are a number of challenges that may face the knowledge transfer process. One of these challenges is the nature of IS development, with regards to each one of the involved parties speaking different business languages, which may result in reducing the likelihood of a complete transfer.

> "This is normal in these projects, because people aren't working in the same profession, so they may not understand everything we say." (Customer_02)

> "…of course we need more time to explain. Not to mention the differences in the used business language." (Customer_04)

Another challenge is the lack of detail in respect to the requirements and business roles from the customer's side. This means, the customer may be at a higher level of profession when it comes his business, however when it comes to expressing the business needs or teaching others, particularly the people who are from another business group, this may not be at the same level of effectiveness. Another possible reason for this is the lack of customer experience with respect to IS development.

> "I think they didn't understand us because of our lack of experience when it came to teaching our business concepts." (Customer_01)

> "Our business roles are difficult to teach." (Customer_05)

The data analysis suggested a number of challenges are also faced by the developers. One of these is that the developers may suffer from a lack of experience in respect to requirements gathering and analysing, or maybe with respect to IS development practice in general. The can lead to poor analysis and inaccurate requirements gathering.

> "The requirement gathering took less than a day, and they didn't gather enough information. Actually, we have been tricked by their low level of analysis." (Customer_09)

According to the customer, the absence of a clear imagination with respect to the expected looks and performance of the proposed IS product may obstruct the knowledge transfer process. In other words, this issue happens if the developers skip the creation of the prototype. Actually, the majority of the interviewed customers considered the prototype as a crucial technique to transfer and confirm their requirements. Also,, in a way, it significantly manages the customer's expectations.

> "They did not create a prototype, this is why we faced a lot of problems later." (Customer_06)

> "Using this prototype makes me feel like this is the actual program that we ordered." (Customer_03)

With regard to moral challenges, a number of the customers complained because of being misled by the developers. This occurred because the developers' pretended to understand all the requirements. Also, the contract failed to include some of the requirements and omitted the developers' verbal promises. So, these developers' aimed to sign the contract more than focusing on learning and achieving the requirements. Such challenges arise later during the development stages and the testing phase.

> "Unfortunately we had been cheated by an IS vendor, who failed to complete the project, and this cost us a lot more." (Customer_07)

> "They gave me a fake response that made me think they understood but the truth was later revealed." (Customer_06)

● *A'.3 Dealing with unclear ideas and requirements*

The majority of the customers pointed out it is possible to detect the issue of unclear ideas during review meetings or testing the IS product. In that case, it is important to verify the situation by reviewing the requirements document. Accordingly, the customers should meet the developers to reach a suitable solution, in terms of modifying the code to include the missing requirements.

> "I can point out any challenge with requirement during monthly review meetings when we discuss the progress. Or maybe when testing the final release of the IS product. So in case there were unclear or missing requirements, then we should meet the developers to check the requirement document, and to arrange to fix the code to deal with this problem" (Customer_10)

● *A'.4 Replies for Customer's responsibilities for unclear ideas*

When interviewing the IS project managers, they mentioned a number of the incomplete knowledge transfer reasons. Additionally, they claimed the customer was responsible for some of these. Two of these reasons were "Customer is unable to clarify" and "The incompetency of the customer's knowledge source", which means when it came to stating requirements, the

customer instead provides general statements. Furthermore when it comes to reply to a developer's inquiries, the customer's knowledge source seems less able to answer. In response, the majority of interviewed customers approve these points. Also, as previously mentioned, the customers pointed out this possibly happens due to the lack of experience when it comes to teaching others about their business role, and when it comes to engaging with IS development practice. These requirements might be stated by a non-involved person with the actual process (i.e. higher managers), thus they do not have much to say when writing these requirements.

> "Our business roles are difficult to teach." (Customer_05)

> "Yes it happened twice, what happened is that my manager took the decision and filled the forms during the meeting without consulting us." (Customer_02)

However, a number of customers claim it's not the customer's responsibility to clarify everything. Actually it is the developer's duty to extract the requirements. Therefore, the developers' lack of experience has led to poor analysis problems.

> "Excuse me, this is the developers' job to collect the requirements, not mine." (Customer_06)

> "Well you should blame their neglect when they collected my requirements." (Customer_05)

The next mentioned reason by the project managers was "Customer's lack of communication". The customers responded and justified this by stating it was a matter of work priorities. The customer is involved with a number of duties that don't include the IS development so they aren't focused on that one particular. Also, rather than answering random phone calls or replying to emails, there should be a specific time to organise the communication between the customer and the developers to reply to all queries. For example, periodic gathering at the end of each project stage, or weekly review meetings. Furthermore, such a meeting should be stated in the project plan and organised by the IS project manager from the developers' side.

> "I am a busy man, I can barely finish my work here. So how can I reply to their random phone calls?" (Customer_01)

> "It depends on my priorities, and what I should do first. Also, we can discuss this later in the weekly meeting but not during my own time. We've previously arranged for that." (Customer_05)

Another reason behind knowledge transfer challenge happens because of "Customer's multiple knowledge sources" where each source's requirements may contradict another source's requirements in terms of the business aspects. The majority of the customer's admitted this challenge, furthermore they blamed the mis-coordination between these sources on the customer's side along with their absence at meetings.

> "This happens due to the mis-coordination between internal departments." (Customer_03)

> "If our people could get together in the meetings, but they can't because of their duties." (Customer_04)

The last highlighted point by the project managers is that, because "The customer keeps adding requirements", this may contradict the previous points and impact on the whole development process. From the customer's viewpoint, this happens for a number of reasons. First, more requirements should be added at the beginning in order to overcome the developers' misunderstanding of the original requirements. Second, the changes in the business, particularly the emergent ones or during the long term project (e.g. more than 4 months), force the customer to add or change the requirements in order to fit with the changes. Otherwise it's not possible to use the proposed IS product based on the original requirements. Third, the customer is not that aware of the impact of adding new requirements on the IS development process, particularly if the developers keep approving these extras without any arguments or complaints. Moreover, the customers claim that, because of the last two reasons, the IS project manager should be blamed, as it is the project manager's responsibility to educate and make the customer aware from the very beginning., Additionally, due to the lack of the project manager's rigorous commitment to the original

project plan, he allowed these additional requirements to negatively impact on the development process without any prior warning.

> "We have to do this because what they did is not what we asked for." (Customer_03)

> "The business has its own changes every day, which in turn forces us to change current systems to continue, particularly with the emergent changes." (Customer_07)

> "We add new requirements because we want to meet the new changes in our daily business, especially in a long term project which needs for example, more than 4 months." (Customer_04)

> "Why not adding more requirements as they approved them all the time? They never told me it could have a bad influence on my project." (Customer_01)

> "Please, this is the fault of the project manager. He did not tell me about the negative effects, and just kept accepting my new requests." (Customer_05)

B'. Project Escalation

● *B'.1 Actors behind project escalation*

According to a customer's understanding, IS project escalation may happen because of two actors, namely the developers and the customer.

> "Creating this IS product is the responsibility of us and the developers. So we are all blamed for the escalation problem" (Customer_09)

More explanation with respect to the impact of these two actors is coming next.

● *B'.2 Reasons behind project escalation*

The customer's mentioned a number of reasons behind the issue of IS project escalation. The following will discuss these reasons according to impact the each actor.

On the one hand, the developers are responsible for a number of reasons in terms of the following. First, due to the developers' lack of experience with respect to IS developments, they spend longer time than what originally planned to finish the tasks.

> "They literally tricked us. They never committed to the schedule nor respected the deadline. So our project was kept open for longer, and that delay cost us a lot." (Customer_05)

Second, the subsequent increase of manpower, hardware, and cost reflects poor project planning and underestimating of the required resources.

> "… they increased the working time and later added more programmers and computers … actually I told them to be more careful when they set their project plan." (Customer_06)

Third, as the customer is less able to track or monitor the development progress, they are being misled by inaccurate developers' reports, which do not reflect the actual work achieved.

> "If we knew how to write these computer programs, they would not be able to mislead us by fake progress reports" (Customer_07)

The fourth reason is the poor contract in terms that it doesn't cover all the agreed details of the project. Furthermore, this includes a customer's requirements and other issues. For example, the existence of unidentified expenses (e.g. the cost of the hardware, the cost of the training to use the product), and not identifying the involved people from the developers' side (e.g. the system analyser who gave a lot of verbal promises during RE process, the project manager who represented the link between the involved parties). So, the existence of such weak points in the contract may allow the developers to benefit by charging more to the customer and delaying the project's delivery time.

> "During the meeting we received a lot of verbal promises from the analyser with respect to our requirements, later we were surprised at these promises weren't included in the contract.." (Customer_06)

> "In one project, the main project manager was in another country under the pretext that his location was not specified in the contract!" (Customer_05)

> "We had to pay more money to buy the hardware, because it was not declared in the contract." (Customer_04)

On the other hand, the customer shares the responsibility as an actor behind IS project escalation. For example, due to emergent situations, the customer may change the project scope or bring the deadline forward. In other words, it is customer's response to sudden business circumstances which force the changes to the original project plan. As a result, this will harm the project's operation particular, especially if this change occurs in the later stages.

> "This maybe happened because we changed the scope at the last minute, and this required major and rooted changes … without these changes we will would be able to issue e-tickets for the airline companies." (Customer_04)

> "Our new higher management forced us to finish this project earlier as a way to add more pressure… unfortunately by speeding up the process, the new plan was useless and we lost control over everything." (Customer_02)

On more reason behind IS project escalation, is Unclear ideas with respect to the customer's requirements. The majority of the interviewed customers declared this was a common and well known challenge for IS project escalation, regardless of whose responsibility it was. This resulted in an increase in time, effort, and cost to clarify misunderstandings and to overcome what was achieved, based on inaccurate ideas.

> "Of course this happened as a result of misunderstanding the requirements, these programmers did something which didn't meet with our requirements. So they had to start over again." (Customer_03)

> "In this type of project, it is commonly known that a situation of unclear ideas is highly expected, so we won't be surprised for additional increases in time or cost." (Customer_05)

● *B'.3 Dealing with Project Escalation*

According to the customer's viewpoint, there is a limited number of options to deal with the situation of project escalation. The first option is to accept the situation and be patient until the end of the project, regardless of the huge increment in cost and late delivery. By doing this the chance of completing the escalated project is in a way better than rejecting the whole project and starting over with another IS development organisation.

> "Unfortunately we had to continue, because we had a better chance of completing the project instead of hiring another vendor." (Customer_02)

The second option is to allow a certain percentage of escalation in cost and/or in time (e.g. between 10% to 40%) and continue with the project until delivery. Actually, a number of customers have reasonable familiarity with IS development risks, and they expect incremental increases in cost and time to be in place from the start.

> "I was prepared and requested 7,000 working hours, which is 40% more time, just to be in case." (Customer_06)

The last option is to reject the project and cut the waste in expense and time, particularly if this escalation exceeded the considered tolerances.

> "… enough wasting our time and our money, killing this out of control project is necessary here." (Customer_07)

● *B'.4 Replies for Customer's responsibilities for Project Escalation*

When interviewing the IS project managers, they mentioned a number of reasons with respect to IS project escalation, in addition they claimed the customer's responsibility for some of them. The first reason is "The Customer has a hidden agenda beyond project success". The majority of customers acknowledge such an issue and identify it as a moral challenge on the customer's side. Also, they mentioned that dealing with it required internal

monitoring from higher management levels. Alternatively, they could hire a third party (e.g. consulting organisation), to observe the entire project process and challenge any irresponsible behaviour.

> "Unfortunately such bad behaviour happens in my company… I believe our higher management should be more rigorous, and keep their eyes open." (Customer_01)

> "I can't find any justification for such an irresponsible attitude… hiring a consulting or observational party may limit this unacceptable attitude." (Customer_04)

The second mentioned reason by the project managers is the "Customer's lack of awareness in terms of developing and using IS products". Customers believe it is the IS project manager responsibility to educate and aware them about the process of developing an IS product. As customers, their primary role is to know about their business and to state their requirements. On the contrary, the IS project manager, who should be experienced in their profession, should know the required needs and the pitfalls to avoid in order to have project success.

> "My role as a customer is to tell them what I want and what my profession is, well on the other hand it is their job to be aware of the required needs to have a successful project." (Customer_05)

> "Please, this is the fault of their project manager. He didn't tell me about the negative effects, and kept accepting my new requests." (Customer_04)

> "Well, they did not tell me about these issues." (Customer_06)

The last reason is "The customer keeps changing the Project's scope". The customer already replied to this point when they justified their need to add on-going requirements, which occurs in response to emergent changes in the business. These changes force the customer to change the scope in order to make the IS product useful when it's delivered. Otherwise, completing the IS project without these changes may lead to neglect in using the product. Also, there should be a clear procedure to add or change the requirements or what called "Change order request". This procedure concerns with the feasibility to

add or change the requirements, and considers with the related additional increase in cost and time. Furthermore setting such a procedure is the responsibility of the developers.

> "The business has its own changes every day, which in turn forces us to change current systems to continue, particularly with the emergent issues." (Customer_07)

> "It is my right to add or change my requirements as long I am paying for the (Change order request) in case they approve the feasibility and the expectant impact on the project." (Customer_06)

> "Why complain about that? They were the ones who introduced the (Change order request) system." (Customer_04)

6.2.3 The Relationships between the Themes According to the Customers

Based on this narrative, it is possible to summarise the relationship between the actors and the reasons behind both unclear ideas and project escalation as follows in Tables 6.5 and 6.6.

Table 6.5: The Reasons and Actors behind Unclear Ideas

Unclear Ideas	
The Reason	**The Actor**
The nature of IS development	-
Requirements' lack of details	The customer
Poor analysis	The developers
Inaccurate expectations, or not using the prototype	The developers
Being tricked by developers (False pretence of understanding the requirements, breaking verbal promises)	The developers

Source: Developed by the author

Table 6.6: The Reasons and Actors behind Project Escalation

Project Escalation	
The Reason	**The Actor**
IS development lack experience	The developers
Poor planning	The developers
Inaccurate progress reporting	The developers
Poor contract	The developers
Unclear ideas	The customer and the developers
Scope and Deadline changing	The customer

Source: Developed by the author

The reasons of (Customer is unable to clarify, The incompetency of knowledge source, Customer's multiple knowledge sources, Customer's lack of communication, The customer keeps adding requirements, The Customer has a hidden agenda beyond project success, Customer's lack of awareness in terms of developing and using IS products, The customer keeps changing Project's scope) were originally and only mentioned by the IS project manager in the first stage of data collection. For this reason these reasons are not included in these tables, which only represent the customers' opinion.

Worth mentioning, the theme 'A'.2 Reasons behind unclear ideas and requirements' from the first construct will be replaced by the theme 'B'.1.3 Unclear ideas' from the second construct in order to facilitate discussion, particularly as they both represents the same meaning. Furthermore the theme of 'B'.1.3 Unclear ideas' is the only common one between these two constructs, in which it sets the theoretical coding process directly without any complications.

The following is the developed analysis table 6.7 to identify the relationships between the themes in this stage of data collection.

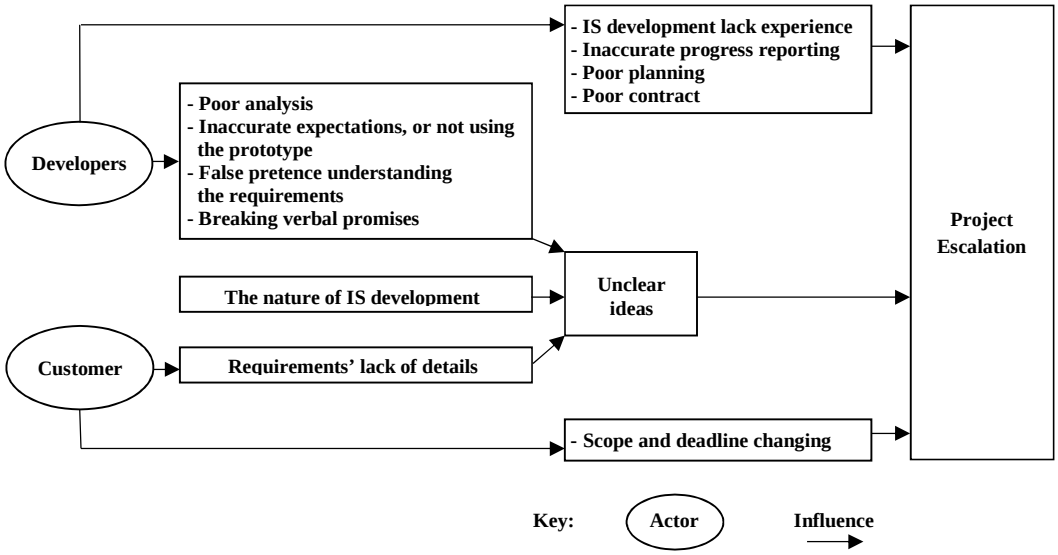
Table 6.7: Identifying Relationships Between: the Reasons Behind Unclear Ideas and Project Escalation According to the Customers' Viewpoint

Key Theme	**Evidence**	**Interpretation**	**Related theme**
B'.1.1 The Developers	"The requirement gathering took less than a day, and they didn't gather enough information. Actually, we have been tricked by their low level of analysis." (Customer_09)	A'.2.3 Poor analysis	B'.2.1 Unclear ideas
	"They did not create a prototype, this is why we faced a lot of problems later." (Customer_06)	A'.2.4 Inaccurate expectation	B'.2.1 Unclear ideas
	"They gave me a fake response that made me think they understood but the truth was later revealed." (Customer_06)	A'.2.5 Being tricked by developers	B'.2.1 Unclear ideas
	"They literally tricked us. They never committed to the schedule nor respected the deadline. So our project was kept open for longer, and that delay cost us a lot." (Customer_05)	B'.1 Actors behind project escalation	B'.1 Actors behind project escalation
B'.1.2 The Customer	"I think they didn't understand us because of our lack of experience when it came to teaching our business concepts." (Customer_01)	A'.2.2 Requirements' lack of details	B'.2.1 Unclear ideas
	"This maybe happened because we changed the scope at the last minute, and this required major and rooted changes … without these changes we will would be able to issue e-tickets for the airline companies." (Customer_04)	B'.1 Actors behind project escalation	B'.1 Actors behind project escalation
A'.2.1 The nature of IS development	"This is normal in these projects, because people aren't working in the same profession, so they may not understand everything we say." (Customer_02)	B'.2.1 Unclear ideas	B'.2 Reasons behind project escalation
B'.2.1 Unclear ideas	"In this type of project, it is commonly known that a situation of unclear ideas is highly expected, so we won't be surprised for additional increases in time or cost." (Customer_05)	B'.2 Reasons behind project escalation	B'.2 Reasons behind project escalation

6.2.4 Drawing Influence Diagram

It is possible to represent the relationship in the above table by using the influence diagram as follows in Figure 6.1.

Figure 6.1: Influence Diagram of the Relationship between the reasons behind Unclear Ideas and the Project Escalation According to the Customers' Viewpoint



Source: Developed by the author

This diagram summarises all the relationships between the reasons behind unclear ideas and the project escalation from the customer's viewpoint. It appears the relationship looks to be direct rather than complex. In other words it is not that complicated, and it is not that deep comparing to the IS project managers' perspective.

Moreover, the size of the boxes on the developers' side seems to be larger, which in a way confirms the previous suggestion that the developers have a more responsible role when it comes to the reasons behind both unclear ideas and project escalation.

This is the end of the analysis of the second stage of data collection.

6.3 Conclusion

This chapter analysed the data of the second stage of data collection, in which the resulted outcomes presented the customer's viewpoint. The main constructs and themes are identified first. Then a narrative which summarises and links the research concerns and customer's' answers is generated. Later, an influence diagram which clarifies the relationships between the actors and reasons behind unclear ideas and project escalation is developed.

The next chapter will shed light on the analysis on the related data to knowledge transfer between the customer and the developer in IS development projects, in which it addresses the second aim of this research.

Chapter 7: The Analysis of Knowledge Transfer related Data

7.1 Introduction

Chapter 5 and Chapter 6 analysed the data of the first and second stages of data collections respectively. The analysis in these two chapters addressed the first aim of this research, in terms it concerned with the actors and the reasons behind the challenges of incomplete knowledge transfer and project escalation. In addition, the analysis figured the links between these reasons according to the viewpoints of a number of IS project managers and customers.

This chapter will address the second aim of this research. In which this chapter will focus on the knowledge transfer related data from both stages of data collection. That is in order to identify the incorporated artefacts within RE process.

7.2 Developing a Framework for Knowledge Transfer in RE Process

7.2.1 Identifying Knowledge Artefacts

This round of analysing the interview data from both stages of data collection, with its focus on knowledge transfer practice in IS development, was able to mainly classify five types of knowledge artefacts, namely: 'Initial Request', 'Features', 'Process Diagrams', 'Prototype' and 'Requirements'. Additionally, the analysis clarified how these artefacts were created and utilised, the parties involved in their creation, and described their functions to facilitate knowledge follow between the customer and developers process during the RE activity on five steps, namely 'Requesting a Project', 'Meeting and Brainstorming', 'Creating Process Diagram', 'Creating Prototype', and 'Generating Requirements Document'. Later, based on the findings of this round of data analysis, a suggested process model for knowledge transfer in RE process was developed.

The following is the developed analysis Table 7.1 which used to identify the knowledge transfer steps and their related artefacts.

Table 7.1: Identifying Steps of: Knowledge Transfer in RE Process According to the viewpoint of Project Managers and Customers

Key Term	**Evidence**	**Relation**	**Interpretation**
Step-1: Requesting a Project ('Initial Request' Artefact)	"In the beginning we briefly collected our requirements, and then wrote them in the Initial Request form. Later we sent this form to the developers." (Customer_01) "First, the customer should fill in a number of forms to tell us about his business, and what the inputs and outputs are, what the main purpose of the system is. I'll use this information to get brief details about the new system, and to find the project manager and developers with experience of the customer's business."(PM_25)	Involved Actor	Customer
		Action to be taken	Filling in paper forms
		Artefact type	Paper Forms
		Contents	Getting brief idea about the proposed IS product and customer business
		Implication	Assigning a project manager and developers with suitable experience.
	"When I say (Balance) this word has a meaning when talking to a banker; at the same time it has another meaning when talking to an airplane pilot. So you should consider reading these forms many times to maintain your expectations."(PM_6)	Implication	Establish a common lexicon around the customer's activity
Step-2: Meeting and Brainstorming ('Features' Artefact)	"In such a meeting, we all sit and start talking about this system, then we move to the brainstorming phase and discuss all the possibilities, during this we write notes and draw sketches on paper about the expected interface and reports."(PM_2)	Involved Actor	Customer, Project Manager,
		Action to be taken	Meeting, Brainstorming, Hand writing sketches and drawings
	"We present on our company and our profession during this workshop." (Customer_06)	Action to be taken	Slide presentation
	"After long hours of meetings and discussions, we end up with a huge amount of papers that include hand sketches, presentation slides, sample reports, the expected interface design, and the business roles. In short, these papers contain all the required features and functions of the new computer software ..."(PM_02)	Artefact type	Set of papers
		Contents	all the features of the IS product , like business roles, the probable screen design, the desired functions, and the expected produced reports

Key Term	Evidence	Relation	Interpretation
Step-2: Meeting and Brainstorming (Continue)	"Later we keep all these documents in the project folder, because they represent a reference for the design and functions of the computer software. Let's say all the needed features are stored in these documents, and they will be the guide to get to the requirements." (PM_13)	Implication	Represents the main reference that guide the analysis to reach the requirements
Step-3: Creating Process Diagram ('Process Diagram' Artefact)	"Later, we met without the customer to analyse his ideas. We drew a model diagram which represented the business model using UML and flow charts. We then run some business cases to simulate the process." (PM_15)	Involved Actor	Project Manager, Developers
		Action to be taken	Creating process diagram using flow chart or UML
		Artefact type	Process Diagram
		Contents	Description of IS product process according to number of possible scenarios
		Implication	Provides comprehensive understanding to the developers with respect to the process of IS product.
	"…because this project manager understands the banking business, he taught us and helped us to maintain the process and coding."(PM_8))	Action to be taken	Brokering

Key Term	Evidence	Relation	Interpretation
Satge-4: Creating Prototype (‘Prototype ‘Artefact)	"Now is the time to confirm your understanding so you have to create a prototype to show the customer your ideas about the system, like screen design, expected process, and a limited number of functions. The customer will test it and focus on the GUI on the computer screen and tell you about any modifications. This is s the best way and best time to get his feedback."(PM_14)	Involved Actor	Customer, Project Manager, Developers
		Action to be taken	-Creating Prototype, by designing the (GUI) using pictures and text with almost no serious coding. Or by creating a smaller version of the proposed IS product with very basic functions
		Artefact type	Prototype
		Contents	Number of the features of the IS product, like business roles, the probable screen design, the desired functions if possible.
		Implication	Manage expectation, Confirm the received knowledge,
	“Through reviewing the sequence of these prototypes’ screens on the computer, I can easily point out the problems.” (Customer_09)	Action to be taken	Testing the prototype, Identify any challenge with respect to customer’s requirements

Key Term	Evidence	Relation	Interpretation
Step-5: Generating Requirements Document ('Requirements' Artefact)	"Once the customer likes the prototype, we write everything down and generate the requirements document. Everything goes into the document, including the prototype, process model and customer's notes during the meetings.."(PM_9)	Involved Actor	Customer, Project Manager, Developers
		Action to be taken	Write down and document all verified specifications and requirements of the proposed IS product
		Artefact type	Requirements document
		Contents	all verified specifications and requirements of the proposed IS product
		Implication	Stating the wanted requirements,
	"We worked together to write the business requirements document. They described everything and then I corrected their mistakes, so that only my accurate requirements were recorded." (Customer_05)	Implication	Confirm knowledge transfer
Process Iteration	"Sometimes it's good to take the prototype to the JAD sessions and start the process over again; this helps to have a better understanding to negotiate with the customer of course this in turn will improve the UML diagrams and the prototype." (PM_15)	Implication	Gaining better understanding by dealing with customer's comments and notes
	"We see an improved version of the prototype based on our comments during the periodical review meetings as in these meetings we discuss the project's progress and problems, which includes our comments regarding the prototype. By doing this it helps to verify the requirements." (Customer_07)	Implication	generation improved version of the requirements document

7.2.2 Narrative

Noteworthy, part of this narrative is mentioned earlier when discussed in the themes of (A.2 Knowledge transfer techniques) and (A'.1 Knowledge transfer process), however this one will give more focus and add more comprehensive detail.

● Step-1: Requesting a Project

First, according to the interviewees, the customer should complete specific forms that cover some basic information about the target IS product, like the nature of the customer's business (e.g. finance, human resources, legal), the main purpose of developing the system, the expected users, the expected inputs and outputs, and the existence of similar products. This form is called a Project Request Form in some organisations, or called Initial Request in other organizations.

> "In the beginning we briefly collected our requirements, and then wrote them in the Initial Request form. Later we sent this form to the developers." (Customer_01)

At this level, a simple part of the knowledge is transferred from the customer through using these forms. As they contain basic information about the customer's requirements, it is possible to consider them as preliminary needs. At the same time, these forms represent an 'Initial Request' artefact in which it initiates the request to start the project. Then, a project manager and developers, who have experience with the customer's activity as laid out in the 'Initial Request', will be assigned.

> "First, the customer should fill in a number of forms to tell us about his business, and what the inputs and outputs are, what the main purpose of the system is. I'll use this information to get brief details about the new system, and to find the project manager and developers with experience of the customer's business."(PM_25)

> "Learning about similar products, from this form, would help to maintain my expectations about customer's business and his needs" (PM_13)

> "We call it an Initial Request form, as it contains the minimum required information to start the project." (PM_5)

Moreover, the data analysis suggested the developers may receive training or perhaps spend a reasonable amount of time at the customer's work place to learn about the business this helps to manage the developers' expectations, and to enable them to establish a common lexicon around the customer's activity. This will enhance their level of understanding. For example, if the customer works in finance, the developers may expect to use a number of terms related to that practice (e.g. debit, credit, balance).

> "Usually I ask the developer to visit us and see how we work. From experience this will help them to understand our requirements." (Customer_01)

> "When I say (Balance) this word has a meaning when talking to a banker; at the same time it has another meaning when talking to an airplane pilot. So you should consider reading these forms many times to maintain your expectations."(PM_6)

● **Step-2: Meeting and Brainstorming**

The interviewees highlighted that once the basic concept of the customer's business is established, and the parties involved have been identified (project manager, developers and the customer's knowledge source), they may now be involved in various meeting styles. One style is when the customer arranges a workshop to explain about the business. Another common type of meeting is called a Joint Application Development (JAD) session, where the customer's stakeholders meet the project manager and the developers. In such a session, all parties discuss, or perhaps brainstorm, the desired requirements and the ideas behind the proposed IS product. These meetings may occur more than once. Thus, all parties do their best at this stage to retrieve as much as possible of the customer's knowledge, which may include business roles, the probable screen design, the desired functions, and the expected produced reports.

> "In such a meeting, we all sit and start talking about this system, then we move to the brainstorming phase and discuss all the possibilities, during this we write notes and draw sketches on paper about the expected interface and reports."(PM_2)

> "During these meetings we brainstorm, and discuss what we want in the computer program, alongside the expected business process." (Customer_03)

> "We present on our company and our profession during this workshop." (Customer_06)

Next, according to the data analysis, all the materials used, such as slides, handwritten papers, sketches, report samples and meeting minutes will be gathered together. This set contains all the features that the proposed IS product should have, like the expected user screens design, functions, inputs, outputs, the possible usage scenarios, security levels and more in much greater detail. Therefore, this set of material represents the requisite 'Features' artefact.

> "After long hours of meetings and discussions, we end up with a huge amount of papers that include hand sketches, presentation slides, sample reports, the expected interface design, and the business roles. In short, these papers contain all the required features and functions of the new computer software ..."(PM_02)

> "We answer all their inquiries and give them hard copies of the presentation slides and reports samples." (Customer_06)

At the end of this step, this set of papers of 'Features' artefact will be saved in the project folder. As it represents the main reference with respect to the required features of the proposed IS product, all the next steps will be built according to the stored information in this artefact in order to meet the requirements.

> "Later we keep all these documents in the project folder, because they represent a reference for the design and functions of the computer software. Let's say all the needed features are stored in these documents, and they will be the guide to get to the requirements." (PM_13)

● **Step-3: Creating Process Diagram**

As mentioned by the interviewees, during and after meetings with the customer, the project manager and developers review the 'Features' material to try to understand it and clarify it further. Next, at this step, the developers try to learn about the business process according to the stated roles by the customer. They also represent this piece of knowledge in a more comprehensible way through using a language they better understand. Therefore, it is crucial for them to identify how this IS product will perform in terms of where the process starts, how it flows and where it ends according to different situations as the process may perform differently depending on the number of cases. Therefore, one of the techniques used by developers is to create a process diagram which employs visual representation shapes, like a flow chart or Unified Modelling Language (UML). This diagram also uses drawings associated with descriptions and technical phrases to show the expected product's procedure and reactions based on various possible scenarios. This means, the developers translate the data in the 'Features' artefact into something more in line with their own way of thinking, in order to reach common meaning between themselves as a team and the other involved parties. In order to achieve this, they translated the data into a 'Process Diagram' artefact.

> "Later, we meet without the customer, to analyse his ideas. We drew a process diagram which represented the business model using UML or flow charts because this is the technical language we understand. Then we ran some business cases to simulate the process."(PM_15)

> "It is just few sketches to close the idea to our minds using UML, so we can better understand different scenarios and how they work. This should happen before creating the prototype."(PM_27)

Given the experience that the project manager may have of the customer's activity, the data analysis pointed out such expertise plays an important role in absorbing and explaining the customer's business roles to the developers. This helps the developers to recognise the impact of the business roles on the proposed IS product functions, even if the customer has inadvertently failed to mention some of these Thus, it seems the project

manager acts like a broker who facilitates the knowledge flow to the developers. For example,

> "I remember in a banking project, one of the required functions was to debit money from a customer's account. So the developer wrote the function in a way to directly subtract the amount from the balance. The project manager recognised a problem just before testing, and told us there are were cases where we can't just subtract the money, like if there was a zero balance. Therefore, because this project manager understands the banking business, he taught us and helped us to maintain the process and coding."(PM_8)

> "I enjoyed working with the development team. We'd worked together before and they knew exactly what I was talking about." (Customer_04)

The customer's involvement is not always expected during this step. However, occasionally, the customer may become involved if they have a reasonable understanding of using process diagrams.

> "Usually we don't expect the customer to understand these drawings. Every now and then the customer was able to comment because he had experience of computer programming." (PM_5)

● Stage-4: Creating Prototype

According to the data analysis, the developer's next aim is to confirm their vision and understanding of the proposed IS product with the customer. As the customer may not be able to understand the developers' terms and drawings, there is a need to transform the received knowledge into a more accessible form, which all the other parties can assess and interact with. Therefore, the developers create a prototype of the proposed IS product. One of most commonly used methods of prototyping is to design the expected graphical user screens (GUI) using pictures and text with almost no serious coding. Another method is to create a smaller version of the proposed IS product with very basic functions. This prototype can be accessed and seen on a computer screen. Hence, at this level of the process, the knowledge is transformed into a 'Prototype' artefact that all parties can recognise and work with. Another meeting will then take place where the customer has a chance to

interact with the prototype and to confirm the screen sequences according to the expected process as outlined in the last step, and to test expected functions. This is actually considered to be one of the most effective methods of confirming the customer's ideas, because the prototype closely matches the look and feel of the proposed IS product. The customer's feedback here is therefore critical, both in terms of accepting the prototype or agreeing to modify it.

> "Now is the time to confirm your understanding so you have to create a prototype to show the customer your ideas about the system, like screen design, expected process, and a limited number of functions. The customer will test it and focus on the GUI on the computer screen and tell you about any modifications. This is s the best way and best time to get his feedback."(PM_14)

> "We interact better with the customer through the prototype. It is a smaller and simpler version of the system where it shows the main screens and how to move between them."(PM_5)

> "Through reviewing the sequence of these prototypes' screens on the computer, I can easily point out the problems." (Customer_09)

● **Step-5: Generating Requirements Document**

Next, the interviewees mentioned when all the parties have agreed and approved of the prototype, it is time to write down and document everything to conclude the IS product specifications and requirements. This includes the process model, prototype and full description of the proposed IS product and its functions, in addition to any documents or records which have been produced and approved during the entire process. Therefore, the final document generated will cover all the requirements of this IS product; which means, this document is the 'Requirements' artefact.

> "Once the customer likes the prototype, we write everything down and generate the requirements document. Everything goes into the document,

including the prototype, process model and customer's notes during the meetings."(PM_9)

"This document includes everything, like the screen design, business process, and printed pages from the prototype." (Customer_07)

"We worked together to write the business requirements document. They described everything and then I corrected their mistakes, so that only my accurate requirements were recorded." (Customer_05)

● **Process Iteration**

As highlighted by the interviewees, it is possible to iterate the same processing and repeat the steps from two to five in terms of involving the prototype in the JAD-sessions. This leads to modifying the diagrams and accurately updating the prototype, according to the customer's comments. Moreover, with each session, it is expected that the developers will have a better understanding with regard to the customer's business knowledge and the proposed requirements. Approving and implying the changes suggested each time leads to the generation of a new version of the 'Requirements' document.

"Sometimes it's good to take the prototype to the JAD sessions and start the process over again; this helps to have a better understanding to negotiate with the customer of course this in turn will improve the UML diagrams and the prototype." (PM_15)

"Usually we detect the unclear ideas in a status update meeting, when we show what has been completed and the achievements so far. Actually, with each meeting, there is a good chance for the customer to answer our inquiries and to tell us about his comments regarding the prototypes which were improved after each meeting." (PM_27)

"We see an improved version of the prototype based on our comments during the periodical review meetings as in these meetings we discuss the project's progress and problems, which includes our comments regarding the prototype. By doing this it helps to verify the requirements." (Customer_07)

Finally, once the ‘Requirements’ document has been finalised, the project manager draws up, and attaches, a time plan. Then the customer should accept and sign the contract in preparation for the actual programming phase.

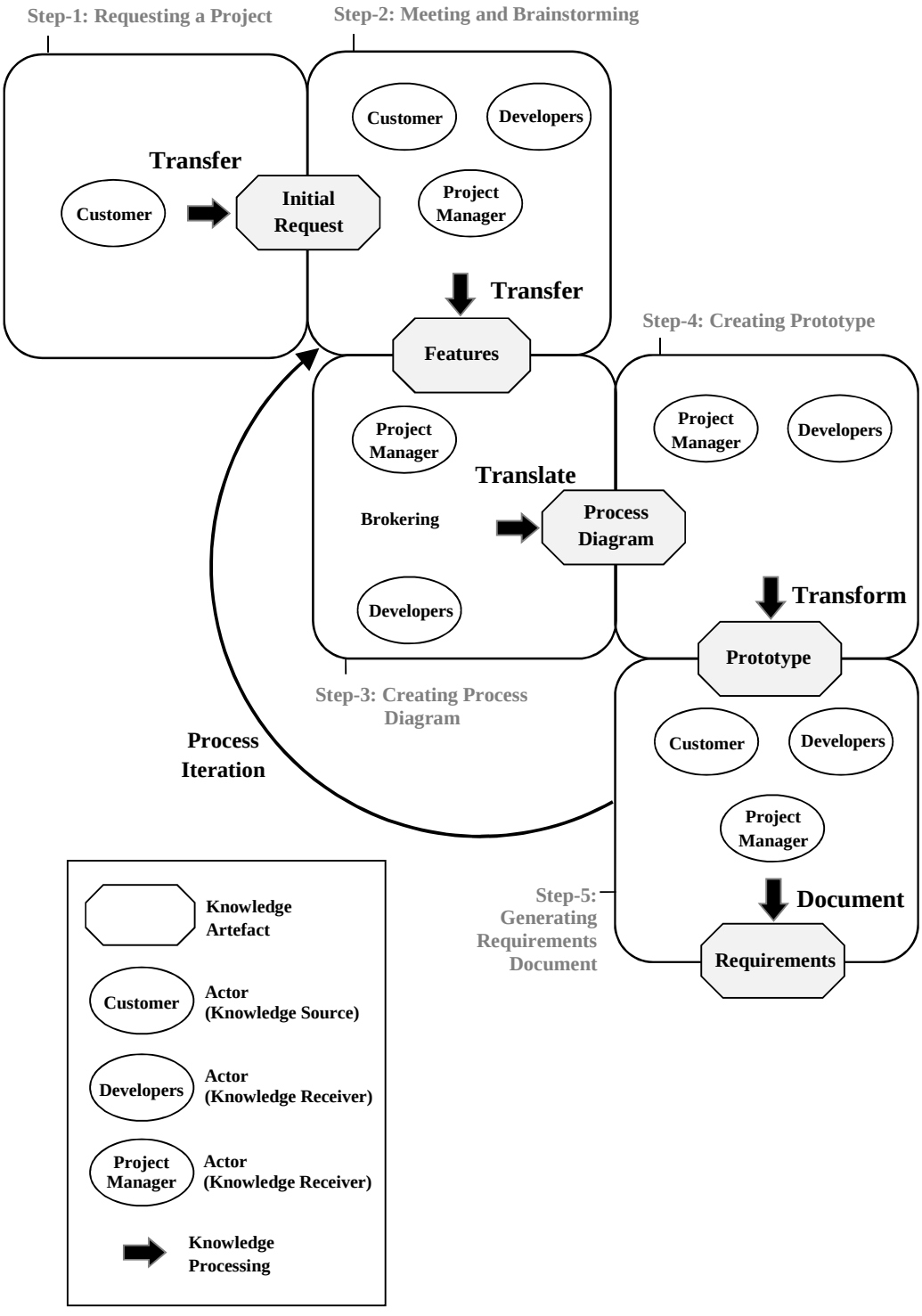
> “Signing the contract is the trigger to start the development, as the customer won’t add any further requirements or descriptions”(PM_2)

> “Signing the contract means we’ve approved the requirements document, and given the signal to start the project.” (Customer_05)

7.2.3 Drawing a Process Model

The next Figure 7.1 is a process model for knowledge transfer during RE phase in an IS development project. This model is developed according to clarified analysis in Table 7.1 and the narrative in section 7.2.2. This model represents the described steps according to the involved actors and artefact.

Figure 7.1: A Process Model for Knowledge Transfer during RE Phase in IS Development Project According to the Viewpoints of IS Project Managers and Customers



Source: Developed by the author

This model illustrates a logical and practical procedure to transfer knowledge between customers (principals) and developers (agents) on five steps. Also, this model clarifies the applied knowledge process type (i.e. transfer, translate, transform), and the involved actors in each step. In addition, this model points to a possible iteration in the process, in which a number of the categorized steps (i.e Step-2, Step-3, Step-4, and Step-5) can be repeated to enhance the results of employing this model.

It is worth noting that the project manager in the framework can be replaced with a developer or system analyser who is experienced in the customer's business. The reason for placing the project manager here is that this was the process described by the majority of responses from the interviewed sample. Particularly, this manager should be aware of the whole requirement of the proposed IS product, in order to make decisions and deal with issues when they arise.

Furthermore, the role of the identified knowledge artefact as objects will be discussed in section 9.3.2.3.

7.3 Conclusion

This analysis chapter addressed the second aim of this research by its focus on the related data to knowledge transfer in both stages of data collections. Thus, by using evidence from this data, a novel framework for knowledge transfer in an IS development project was developed, and a process diagram showing the identified knowledge artefact was created

The next chapter will analyse a number of IS development project cases to find out the reasons behind each specific outcome of a project and RE process in each case.

Chapter 8: Analysing a Number of IS Projects' Cases

8.1 Introduction

Chapter 5 and Chapter 6 analysed the data in both stages of data collection, in which this analysis addressed the first aim of the research. Hence, one of the outcomes of these two analysis chapters is the development of an influence diagram that links between the reasons of unclear Ideas and project escalation (as presented in Figure 5.1).

Chapter 7 concerned with the second aim of this research. In which it focused on the related data to knowledge transfer. Thus, the analysis in chapter 7 created a suggested process model to transfer the knowledge during RE phase (as clarified in Figure 7.1).

This chapter will use the developed diagram in Figure 5.1 and the created model in Figure 7.1 to analyse a number of IS development projects cases.

8.2 Analysing a Number of IS Projects' Cases

During the two stages of data collection, some of the interviewees told a number of stories about their participations in escalated projects, failed projects, and successful projects. In addition, some of the interviewees described their involvements in RE processes, in which process outcomes resulted a number of situations including complete and incomplete knowledge transfer. The following analysis attempts to investigate some of these stories and situations, in order to identify the main reasons and actors behind each outcome of a project and RE process.

In order to simplify the analysis and discussion, the developed (Influence Diagram of the Relationship between the Reasons Behind Unclear Ideas and IS Project Escalation According to the IS Project Managers' Viewpoint) in Figure 5.1 will be referred to as Project Escalation Framework.

In addition, the developed (Process Model for Knowledge Transfer during RE Phase in IS Development Project) in Figure 7.1 will be referred to as Knowledge Transfer Framework.

8.2.1 Case 1: The Project of Warehouse Storage System

Story

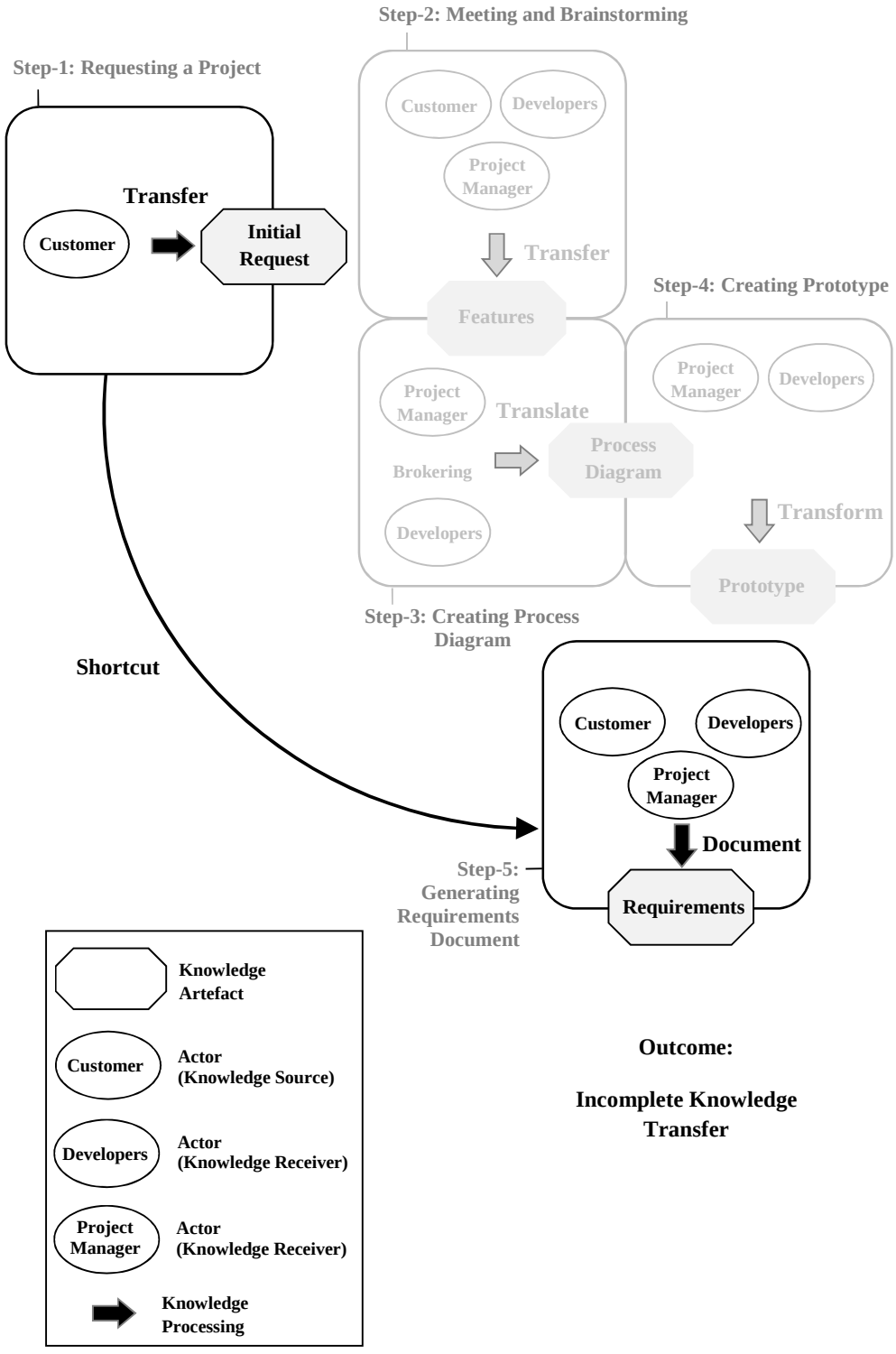
According to (PM_3) "I was leading on a project that involved developing a warehouse storage system that would contain vehicle replacement parts. The main functions of the system were not that complicated. However, the major challenge was to understand the tangled relationships inside the database - these were derived from the customer's business roles. Unfortunately, the customer was not that aware of the difficulty in understanding database relationships, so he did not pay close enough attention when it came to collecting requirements. This led to skipping a lot of important details in the requirements phase. At the same time, our senior IS manager believed it was a simple system to develop. Therefore, the senior IS manager forced us to undertake and complete the project within a month. So, we had to collect the data in a very short time, this led to a lot of confusion regarding the correct business concepts and requirements of the customer, particularly with the absence of an effective process diagram and clear prototype, because we had to jump to writing down the requirements directly. After few weeks of the development, the IS product failed at the testing stage and required major modification. So, we rewrote the requirements documents according to the customer's comments and feedback, and we had to extend the project running time. Unfortunately, we became trapped in this loop of testing failure and requirement modification. Actually, that project kept in an endless loop of modification and lasted 14 months instead of four weeks as originally planned".

Analysis

Regarding the knowledge transfer part, it seems this project has complicated business roles in terms of the tangled relationships inside the database. At the same time, the customer's participation during the RE phase was not very effective. This participation led to vagueness in the requirements,

as a number of critical details were missing. This is the reason for rewriting the requirements after each failure test. What seems important is how this IS project manager, under the pressure of the IS senior manager, had to "jump to writing down the requirements directly", which led to "the absence of an effective process diagram and clear prototype". Accordingly, this presents a shortcut with respect to the introduced five steps in the Knowledge Transfer Framework. In this sense, some of the steps are missed and this leads to a situation of incomplete knowledge transfer. See Figure 8.1.

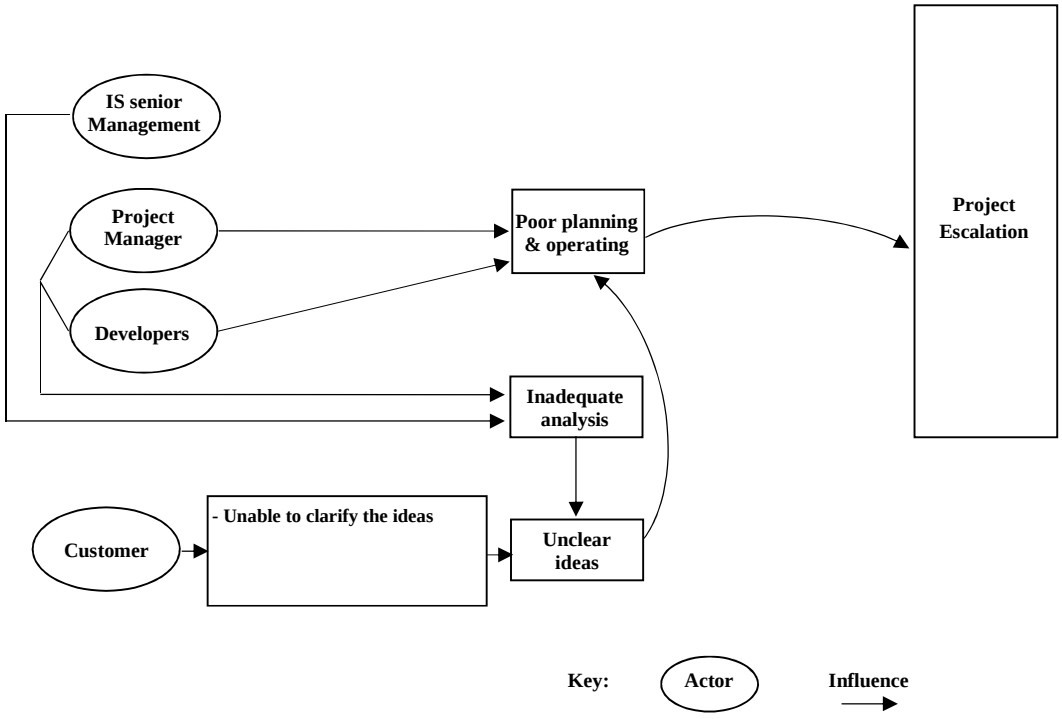
Figure 8.1: Shortcutting the Process of Five Steps to Elicit Customer's Requirements Leads to Incomplete Knowledge Transfer



Source: Developed by the author

Regarding project outcome, there were significant signs of escalation, as expressed by the project manager "that project kept in an endless loop of modification and lasted 14 months instead of four weeks as originally planned". In this respect, this project outcome is the result of a number of reasons. These reasons include inadequate analysis because of the IS senior manager's added pressure, poor planning and operating as project running time was extended many times and did not reflect the original plan, and unclear ideas as mentioned earlier. Figure 8.2 highlights this situation.

Figure 8.2: The Relationships between the Actors and Reasons Behind IS Project Escalation in a Warehouse Storage System Project



Source: Developed by the author

In this framework above, number of the figured reasons, actors, and links between them were already identified in Project Escalation Framework. This sing of acknowledgement between these two frameworks adds more credibility with respect to the finding of this research.

8.2.2 Case 2: The Project of Human Resource Management System

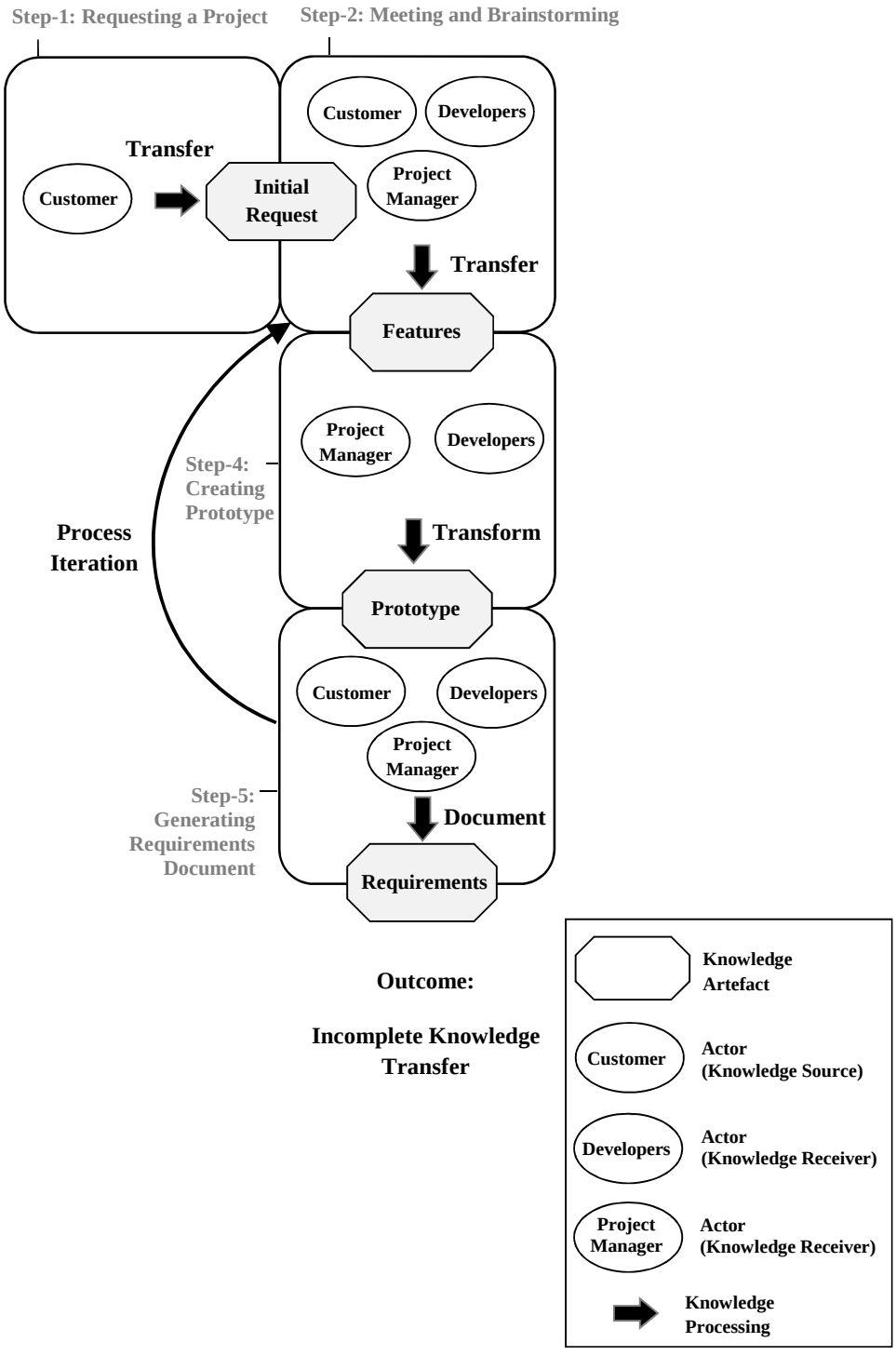
Story

According to (PM_27) "This discussion about escalation and other challenges reminds me of one of the most troubled projects in my life… This project served as a human a resource management system for a very big organisation, where about 35000 employees were working. You can imagine the level of complication with respect to the requirements, in addition to the huge size of the project. I remember the original planning time was 20 months! I faced problems in collecting requirements from customers, as there were seven different internal departments involved in this project. Unfortunately, I could not gather all of these customers at once and this led to confusion in terms of their requirements. Anyhow, we began reading each customer's initial request form and then discussed the details during a number of repeated JAD sessions. However, because of the difficult roles of each costumer's business, we had to completely rely on the prototype to show our understanding of the requirements. In addition, we utilised the prototype to present the expected sequence of GUI screens according to each business scenario as mentioned by the customer. Later, the contract included printed pages of all these prototypes in addition to the final requirements… At the testing phase, we faced a lot of troubles because of a number of unidentified possible business scenarios were not mentioned by the customer. Thus, dealing with these errors required more efforts to fix the code. Actually, due to the resulted workload, we had to add more staff to help us. Unluckily, educating these additional staff about the nature and requirements of this complicated project consumed more time and effort than expected… The situation became even worse when the customers added more functions to the system. These new requirements put more pressure on the project team, who now needed to make further modifications. In this respect, I am not that sure why my senior manager forced me to accept these new requirements… Later, I resigned from my role as project manager, and declared the project a failure".

Analysis

In this project, the project manager followed most of the steps to elicit customers' requirements as clarified in the Knowledge Transfer Framework. The process started by reviewing the initial request form. This was followed by conducting a number of meetings with customers to discuss the requirements, and to retrieve more details. After that, the project manager mentioned that he and the developers had to crucially depend on the prototype to reflect their understanding with respect to the customer's ideas, and to simulate a number of possible business scenarios. Later, the requirement document included a printed page of the used prototypes. What is interesting during this process is the absence of developing and using process diagrams. The impact of this absence was clear, in particular at the testing phase when challenges present themselves because of "unidentified possible business scenarios were not mentioned by the customer". In this respect, this research suggested earlier: developing process diagram in (Step-3) by using flowchart or UML, assists in learning more about system process, and how this system may perform differently depending on various conditions and situations. Moreover, in (Step-3), the role of an experienced project manager as a broker should help to fill any gaps with respect to customer requirements. However, it seems this is not the case here, as this project manager kept complaining from the "level of complication with respect to the requirements", besides this (Step-3) was totally skipped in this project. Furthermore, though the prototype managed to clarify the scenarios which were informed by the customer, the later challenges at the testing phase pointed out this way of utilising the prototype did not effectively serve as the process diagram would. According to this analysis, skipping developing the process diagram leads to incomplete knowledge transfer. See Figure 8.3.

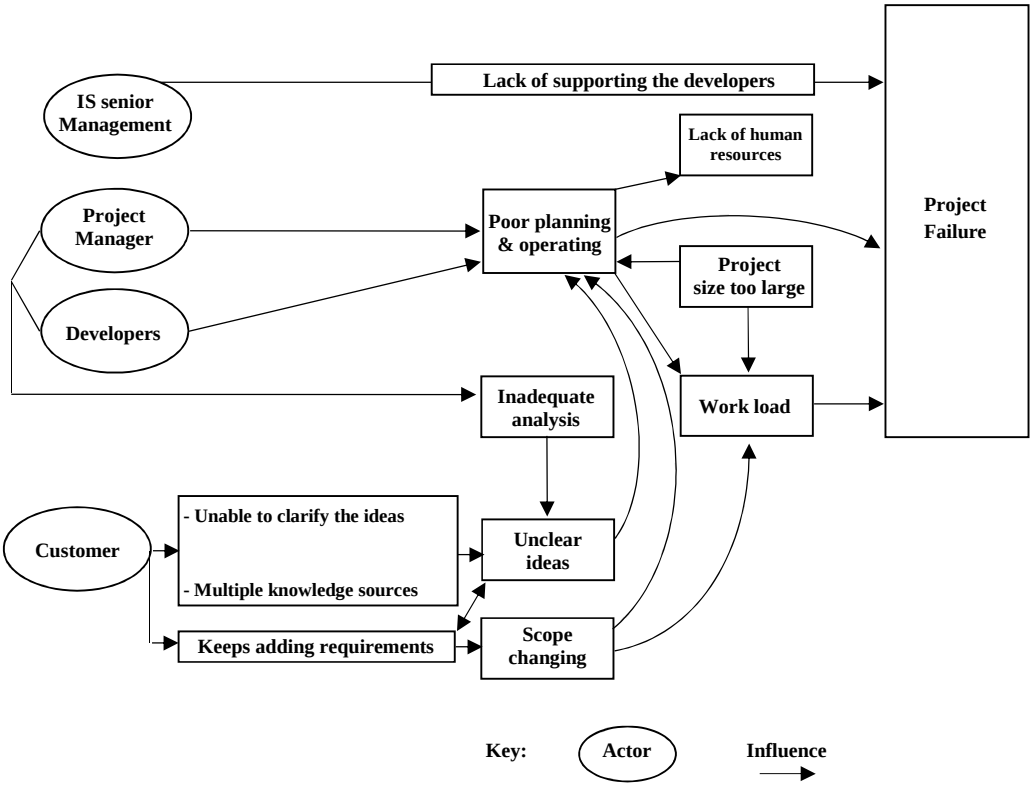
Figure 8.3: Skipping (Step-3) when Eliciting Customer's Requirements Leads to Incomplete Knowledge Transfer



Source: Developed by the author

This project was declared a failure. The project manager mentioned a number of reasons behind this result, in which they include the following. Firstly, the project size was too large, as it was supposed to serve a huge number of users. As such, it involved seven different internal departments, and originally planned to be undertaken over 20 months. Secondly, the requirements of this project were challenging with respect to the complicated business roles, and the contradiction of different multi-knowledge sources from different departments. Thirdly, the later workload and the needing to add more staff reflects the poor planning and operating of this project. Fourthly, considering actors' impact, this takes account of the senior management support lack, in terms accepting the additional requirements of the customer regardless the viewpoint of the project manager. Also, actors' impact takes account to the developer, as the newly added staff required more time and efforts to learn about the project. Figure 8.4 visualises the situation.

Figure 8.4: The Relationships between the Actors and Reasons Behind IS Project Failure in Human Resource Management System Project



Source: Developed by the author

The above figure covers a lot of the cases and actors behind the challenges of unclear ideas and IS project escalation as figured out in the Project Escalation Framework. However, it is worth mentioning, these reasons and actors led to project failure this time. This illustrates a further dimension to the Project Escalation Framework in that it is likely possible to utilise this framework to investigate IS project failure.

8.2.3 Case 3: The Project of Online Hotel Reservation System

Story

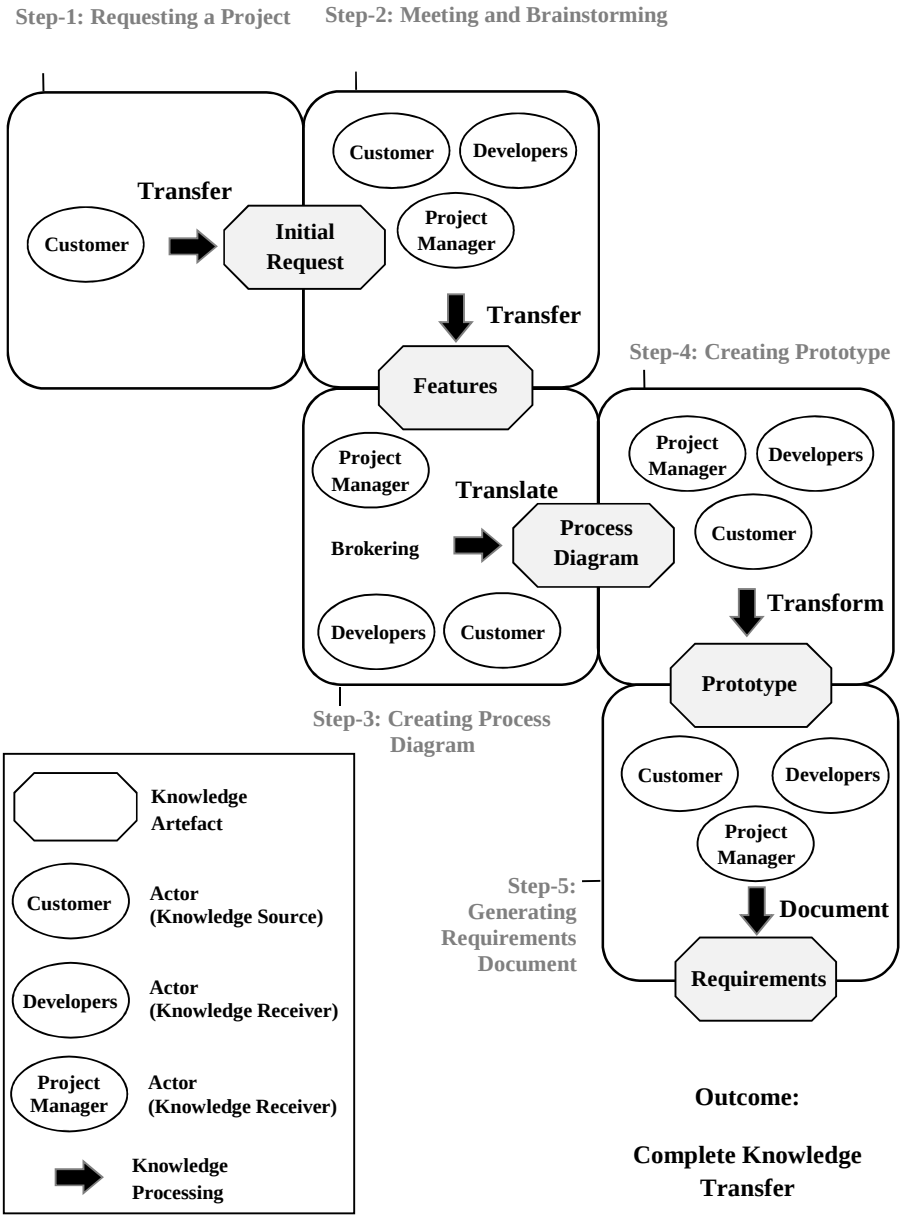
> According to (PM_18) "Let me tell you about my favourite project. The customer was working in the tourism business, and he came to us with an idea about an online hotel reservation system. When I knew about this system from the project request form, I volunteered to lead on this project, because I had used a number of similar systems before. So, I spent two days with one of the developers at the customer's workplace to learn what his exact needs were. After that, we focused on brainstorming to retrieve the requirements from the customer. Developing the flow chart was not that hard, as I was already familiar with this process and its various possibilities. Actually, the customer was so cooperative and helpful, as he aided us in drawing these diagrams, and in creating prototypes screens. In general, the project was not that big, so I knew the required number of developers needed to undertake this project in one month. After three weeks, the system was ready for testing. Then, dealing with a few miner errors took three days. Finally, after two more weeks, the system was deployed and accessible online".

Analysis

This project covered number of successful knowledge transfer factors, in terms of visiting the customer's workplace, and the familiarity of the project manager with the customer's business. In addition to the reasonable experience the customer has with respect to IS development practice, as this customer helped to create the process diagrams. Moreover, it seems the RE process went through all five steps of the Knowledge Transfer Framework. The story

involved reading the initial request form, meeting and brain storming, creating process diagrams and developing prototypes. However, it seems there was no need to iterate the process of five steps to transfer the knowledge. This possibly happened because the customer was involved in all these steps in the first place. Actually, this adds the role of the customer to (Step-3) and (Step-4) when creating the process diagram and prototype. In addition, the project manager's previous experience with the customer's business effectively assisted him in developing "a process and its various possibilities". See Figure 8.5.

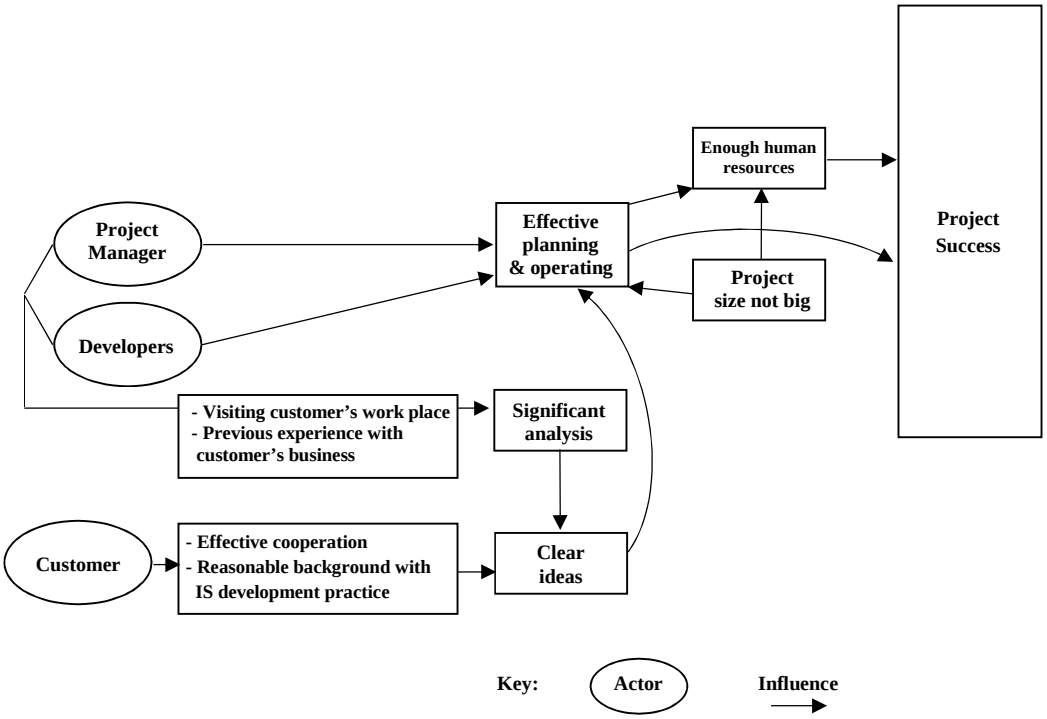
Figure 8.5: Following the Five Steps when Eliciting Customer's Requirements Leads to Complete Knowledge Transfer



Source: Developed by the author

With regards to project outcome, it may be that this project reversed the challenging reasons and factors, and turned them into successful factors. For example, the project size was not that big, the requirements were very clear due to the experience of the project manager and the cooperation of the customer, and the planning exactly identified required time frames and necessary human resources. See Figure 8.6 below.

Figure 8.6: The Relationships between the Actors and Project Success Factors in an Online Hotel Reservation System



Source: Developed by the author

The above figure has a similar structure and utilises opposite effects of the reasons of the Project Escalation Framework. These reasons lead to project success this time. Thus, this analysis suggests the feasibility to use the Project Escalation Framework to study project success.

8.2.4 Case 4: The Project of Financial Management System

Story

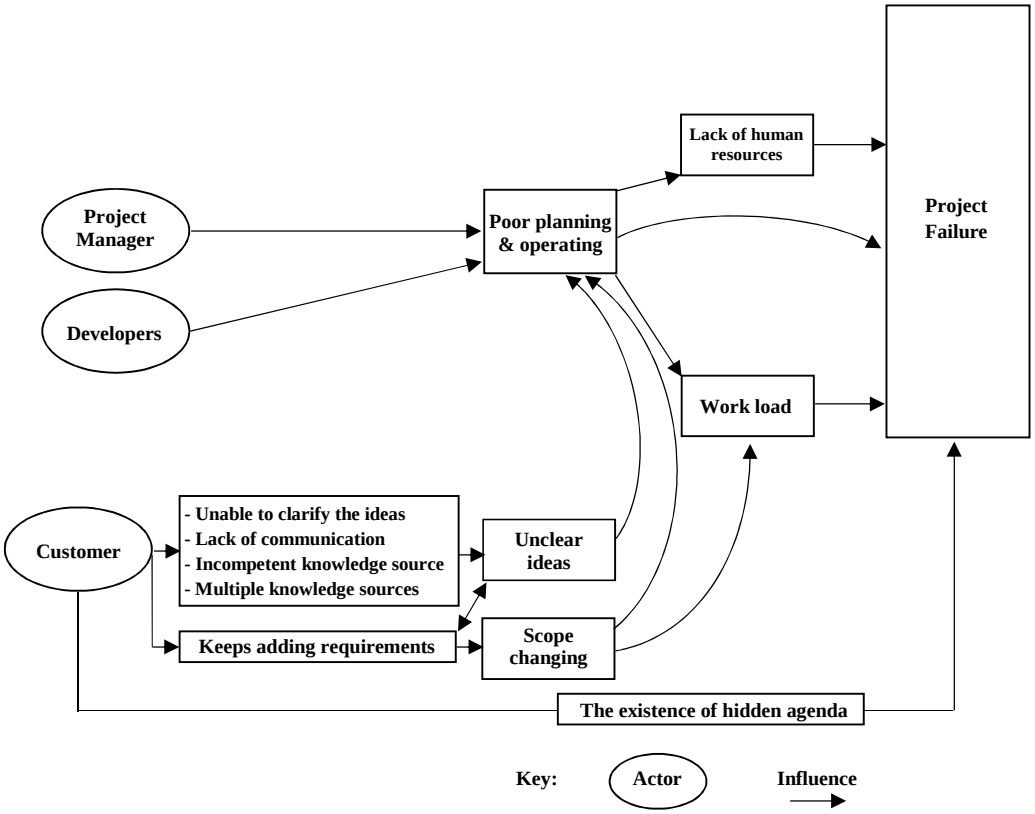
According to (PM_24) "I was working on a Financial Management System project for an educational organisation. One of the customer's representatives was not very cooperative: he missed a number of meetings and did not fully respond to our inquiries regarding project requirements. However, we managed to gather requirements from other representatives, and then we moved on to development phase. Later at the testing phase, the uncooperative

> representative claimed the IS product did not meet his requirements, and he insisted that we make some changes and more requirements. I replied that 'doing such major changes would impact on other parts of the IS product, and this would involve numerous modifications throughout the entire coding'. We settled the situation by extending the project time scale and changing the scope. However, due to the resulted workload, I had to employ additional staff to help. Unfortunately, the same uncooperative representative failed testing again, and requested further modifications. At that time, I realised it was a hopeless project as long as this uncooperative representative kept failing testing for no clear reason. The project failed after 8 months due to the unreasonable workload, and due to wasted time and effort".

Analysis

This story did not provide details about which knowledge transfer steps were followed. However, it seems the requirements were not that clear because of an "uncooperative representative" who presented a lack of communication by skipping meetings, and presented incompetency in terms of knowledge when it came to liaising with developers about the requirements. Moreover, this project failed for a number of reasons which include the following. Firstly, changing the scope of the project because of later added requirements created problems. Secondly, changing the original time plan (which led to add more staff in order to deal with the state of workload) began escalation problems. Thirdly, as the project manager did not consider the impact of unclear ideas because of the uncooperative representative, poor planning and operating in terms of skipping risk management resulted. Fourthly, the irresponsible attitude of one of the customer representatives led to poor communication and testing failure. This attitude reflects the existence of a 'hidden agenda' and goals other than those related to project success. Figure 8.7 highlights this situation.

Figure 8.7: The Relationships between the Actors and Reasons Behind Project Failure in the Financial Management System Project



Source: Developed by the author

Once again, in this story, project failure resulted due to a variety of challenging factors as discussed earlier, in which these factors were used in the Project Escalation Framework. Therefore, this is another sign of the need to employ a Project Escalation Framework to investigate IS project failure.

8.2.5 Case 5: The Project of Online Library Borrowing System

Story

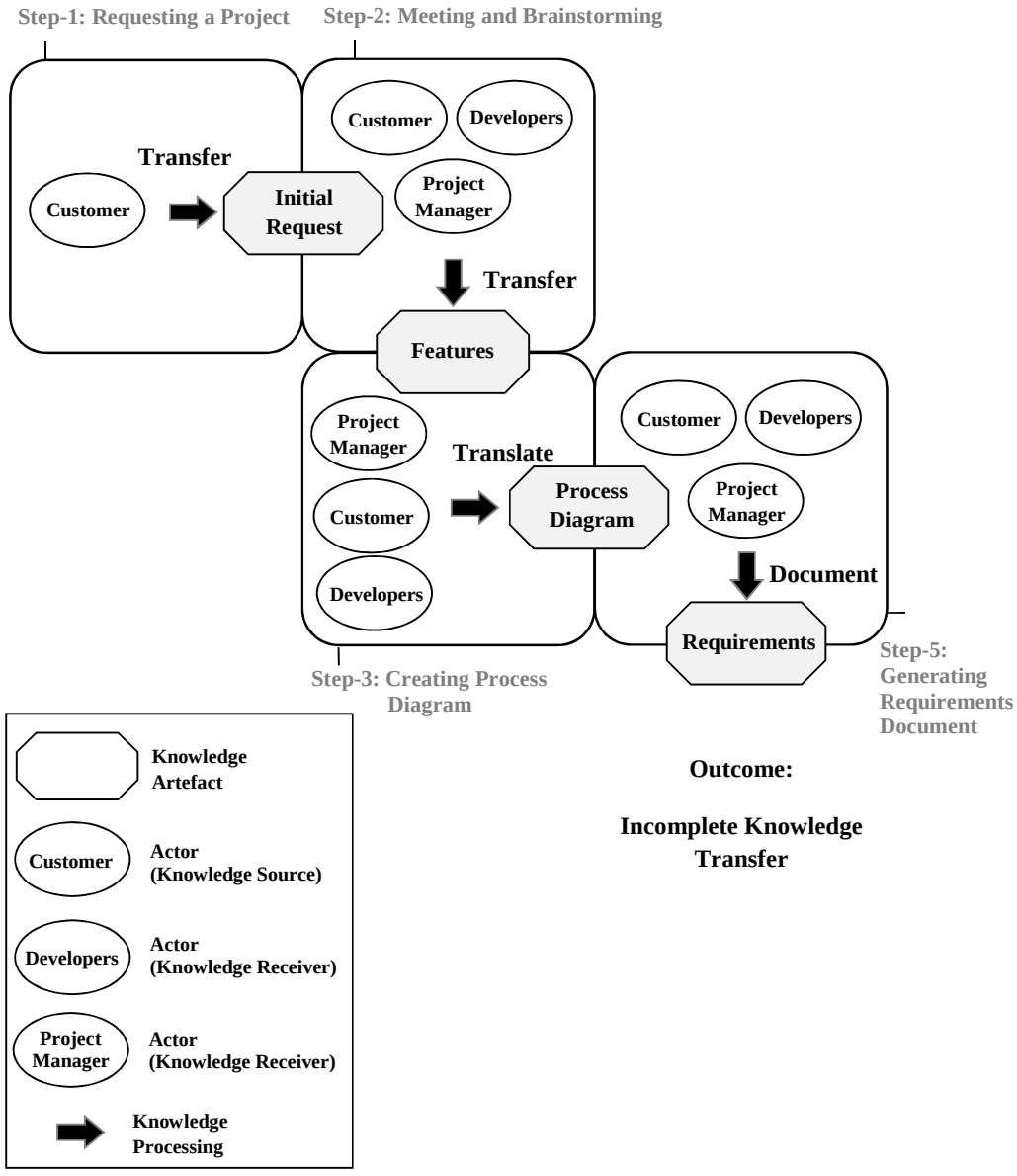
> According to (Customer_8) "I faced some issues with an Online Library Borrowing System Project I was involved in. At that time, I did more than what I supposed to do as a customer. I collected the requirements internally in my organisation, and I filled in the project request form accordingly. Then, during a meeting with developers, I helped draw up the follow charts of the required system. These processes were fairly clear and direct. Besides, the project was not that big in general. Later, I verified the business requirements in person, and signed the contract to launch the project. After few weeks, when testing the system, I faced some troubles relating to user-screens. Most of the requested functions were there; however, the user-screen design was confusing and didn't reflect a logical organisation. So, accessing these functions was not that easy. I fed back to the developers and after another week, the user-screens were re-designed and the system was installed and running in our organisation".

Analysis

This time, one of the customers told about his experience with an IS development project. Regardless of the mentioned challenges, the project succeeds in the end. There was not much evidences of project success factors, except that the project size was not very large, and that the requirements were clear. When it comes to the knowledge transfer process, it looks as though this customer was involved in all steps. As such, the customer filled in the initial request form. Following this, during the meeting with the developers, the customer helped them to draw the process diagram. Though, creating the prototype was missing in this process. As result, the design of the graphical user interface (GUI) was "confusing". A possible reason for skipping the process of creating the prototype by the developers might be the simplicity of the requirements, and the small size of the system. So, dealing with this issue of "user-screens design" took a short amount of time (i.e. one week). This suggests missing step-4, which involves creating the prototype, may lead to

incomplete knowledge transfer, even where requirements are clearly outlined. See Figure 8.8 below.

Figure 8.8: Skipping (Step-4) when Eliciting Customer's Requirements Leads to Incomplete Knowledge Transfer



Source: Developed by the author

8.2.6 Analysis Conclusion

The analysis suggests that the Project Escalation Framework showed potential signs when it comes to investigating project failure in IS development practice. Here, project failure shared the same reasons and factors as those behind project escalation. Additionally, the relationships between these reasons and factors had the same structure of the Project Escalation Framework. Also, when reversing the reasons and factors behind project escalation, it is empirically possible to use them to create a framework for project success. In this framework, the relationships between these reasons or factors behind project success had the same structure as the Project Escalation Framework. Therefore, the Project Escalation Framework has potential to be used for further investigation for purposes besides IS project escalation, like studying IS project success and failure.

When it comes to investigating knowledge transfer in IS development practice. The empirical evidence reflects the significance of following the steps of the Knowledge Transfer Framework in order to successfully elicit customers' requirements. Moreover, other evidence suggests that shortcutting the process, or skipping one of its steps, or miss-utilising one of its identified artefact, is high likely lead to incomplete knowledge transfer. This is the case even when requirements are clearly outlines.

8.3 Conclusion

The analysis in this chapter discussed the extent of applicability of both the Project Escalation Framework and the Knowledge Transfer Framework by testing them in a number of illustrative examples of IS development projects of varying contexts. These contexts ranged from Warehouse Storage Systems, Human Resource Management Systems, Online Hotel Reservation Systems, Financial Management Systems, and Online Library Borrowing Systems. Furthermore, five stories about different projects were analysed.

The analysis highlighted the reasons and factors behind certain outcomes of each project. In addition, the analysis tracked the steps that had been followed to transfer knowledge in each project. Moreover, numbers diagrams (i.e. influences, and process models) were developed to support the analysis.

The next chapter will discuss the analysis outcomes of chapters 5, 6, 7, and 8. In addition, the next chapter will relate the analysis findings to the reviewed literature in light of the employed theories and the used assumptions.

Chapter: 9 Discussion

9.1 Introduction

This chapter presents an overview of the core findings of the analysis. It begins by providing a comparison between the outcomes of each stage of data collection. Then it discusses the findings, and relates them to the reviewed literature in light of the employed theories and the used assumptions. Later, it provides answers to research addressed questions.

9.2 Comparing the Responses Between IS Project Managers and the Customers

IS project managers and customers are both involved in the IS development project. Each party has their own viewpoint which may confirm, oppose, or add to the viewpoint of the other party. This section will try to identify the similarities and differences between these two viewpoints.

9.2.1 Knowledge Transfer

To begin with, it seems the IS project managers are more knowledgeable with respect to the topic of knowledge transfer, in terms of the factors facilitating the process, the used techniques, the effect of clear ideas and requirements, the reasons behind unclear ideas, the impact of unclear ideas and requirements, detecting unclear ideas, and how to deal with these issues. In comparison, customers who only mentioned the process of knowledge transfer and the expected challenges gave fewer details. In a way this makes sense in terms of that the process of requirements elicitation represents a significant part of IS project managers job.

It seems that both parties acknowledge a number of the aspects within the constructs of knowledge transfer. In this regard, as mentioned earlier, both parties' stories suggest there is no contradiction when it comes to the process

of RE. For example, the involvement in various styles of meetings, using the prototype, and writing the requirements documents. Furthermore, with respect to the reasons behind unclear ideas regardless of whose responsibility it is, a number of reasons are repeated, this includes: general requirements with lack of details, poor analysis, and the nature of IS development.

Moreover, with respect to the reasons of unclear ideas, the IS project manager suggests the customer is responsible of five out of seven reasons, about 71%. Whilst the customer response shows the developers are responsible of three out of five reasons which represent about 60%. Additionally, when reviewing customer replies for these responsibility of the number of reasons, as mentioned by the IS project manager, it appears the customers acknowledge these reasons. However, the customers justify such situation by a number of excuses which includes the involvement of the developers and their responsibility. For example, the customers claim it is the developers' duty to retrieve more specifics, and to spend more effort in the analysis in order to overcome the lack of requirements details. Another example, the customers mentioned they had to add more requirements to deal with developers' earlier false pretence of understanding the requirements, in addition it is the developers' responsibility to teach and inform the customer about the negative impact of changing or adding more requirements, particularly in the later stages of the IS development project.

9.2.2 Project Escalation

Noteworthy the differences in the expected understanding and the perception that each of the customers and IS project manager have in respect to the concept of project escalation, in terms the IS project managers are more familiar with project escalation phenomenon due to their profession. Moreover, the author was cautious with this point, particularly when interviewing the customers.

When it comes to the reasons behind project escalation, the IS project managers' responses identified a number of the reasons, which includes Poor planning and operating, Lack of human resources, Workload, Unclear ideas, Scope changing, and Project size is too large. Furthermore, the IS project managers mentioned five possible actors, namely Customer, Developers, Project Manager, IS Senior Manager, and Other parties. The further analysis suggests a relationship between the customer and a number of reasons. In this respect, quantifying the data suggests that the impact of the customer's attitude as a reason has the frequency of 30% which is quite close to the frequency of other actors. On the other hand, the customers' responses identified some reasons behind project escalation which include IS developers lack experience, poor planning, Inaccurate progress reporting, Poor contract Unclear ideas and Scope and Deadline changing. Additionally the customers' responses outlined two possible actors namely Developers and Customer.

It seems that both parties acknowledge a number of the aspects within the constructs of project escalation. For example, a number of reasons are repeated. These reasons include Poor planning, Unclear ideas, Scope changing, and IS developers lack experience. Further example, both groups considered allowing certain degree of escalation, and rejecting the project as methods to deal with such situation.

According to customers' responses, it appears that the developers are responsible for three reasons of project escalation, while the customer is responsible for two, and they both share responsibility for one reason. This suggests that the customer may regard the developer as the more responsible actor, with respect to reasons behind project escalation. More in this respect, when reviewing customers' replies for their responsibility for number of reasons as mentioned by the IS project manager, it looks like the customers' acknowledged these reasons in a way. However the customers justified such situation by number of excuses which include the involvements of the developers and their responsibility. For example, the customers suggest that it is the developers' responsibility to teach and inform the customer about the required awareness for IS development project, and it is the developers' duty to

create a clear process to manage the added or changed requirements (i.e. change order request). The exception here is with the reason of "The Customer has hidden agenda beyond project success" which appears to be the customer's sole responsibility.

9.2.3 Section Conclusion

Generally, the IS project manager's responses are richer in terms of the amount of information provided. This includes more in-depth detail and a more sophisticated relationship between the identified ideas. Furthermore, this may occur due to the difference in the number of the interviewees at each stage of data collection (i.e. 30 IS project managers in the first stage versus 10 customers in the second stage). Also, it may occur because of differences in professional experience in IS development practice. The IS project manager answered questions based on their daily job, while the customer referred to their job role or their limited involvement in such projects.

Actually, this discussion presented an acknowledgement of a number of aspects between the viewpoints of both IS project managers and customers. This includes for example the reasons behind IS project escalation and unclear ideas, how to deal with these challenges, and the used methods during the process of RE to transfer the knowledge. Accordingly, this reflects the effective level of comprehension the interviewed customers have, as their responses confirms a number of mentioned points by the professional IS project managers.

One interesting point is how each party blames the other and tries to present them as the more responsible party for the challenges of incomplete knowledge transfer of IS project escalation. To expand this point, as discussed earlier, according to IS project managers, the customer is responsible for the most of reasons of these two challenges. On contrary, the customer asserts the involvements of the developers and their responsibility in the most of the reasons behind the same two challenges. Such behaviour will be analysed further in section 9.3.1.3, in this chapter, when discussing the signs of Self-Serving Bias in the findings.

9.3 The Findings

For both stages of data collections, the main themes were driven in respect to the research objectives and aims, in terms they identified two main constructs namely (Knowledge Transfer) and (Project Escalation) and they included a number of subthemes within each construct.

9.3.1 IS Project Escalation

9.3.1.1 Relationship with the Reviewed Literature

Regarding the construct of (Project Escalation), the responses of IS project managers discuss the reasons behind such an issue, how to detect it, and what the best practice is when it comes to being prepared or dealing with it. Considering the mentioned reasons, on the one hand, it is possible to distinguish the reasons which occurred by certain actors' behaviour. For example, on the agent side, the developers suffer the lack of IS development experience, the commitment, and the sense of responsibility, the project manager has insufficient qualifications or experience to manage an IS development project, in addition to the influence of a poor relationship with the developers; and the lack of senior management support and their interference with the IS project manager's duties, and the impact of self-justification attitude (e.g. fulfil an earlier promise without consulting the IS project manager). Furthermore, at the principal side, a number of the reasons occurred because of the customer's behaviour. For example a resistance to change, having a hidden agenda in terms of the existence of other goals rather than project success, and interfering with the IS project managers duties by exploiting the good relationship with the IS organisation's senior management. Additionally, other parties may be involved as responsible actors behind project escalation, in which IS project manager has no authority over them. For instance, the delay occurred by outsourced providers (e.g. hardware supplier, trainers), and the mis-coordination with other internal IS development departments (e.g. Security, Quality).

On the other hand, there are number of the IS project escalation reasons which are related to other factors. This includes the impact of poor planning

and operation, a lack of resources due to underestimating these from the beginning or the unavailability of scare resources (e.g. specialised experts in certain fields), the pressure of workload, the influence of unclear ideas and scope changing, and the difficulty of dealing with a large project.

When referring to the four determinants that influence project escalation as suggested by Staw and Ross (1987), namely Project Factors, Psychological Factors, Social Factors, Organisational Factors, it seems possible to fit the mentioned reasons by this study in these determinants as follows:

Project Factors: this includes poor planning and operation, lack of resources, workload, the influence of unclear ideas and scope changing, the project size is too large, and the delay occurred by an outsourced party. These reasons are in some way related to the nature of the project itself and how the management views its objectives and sets its plan and the expected difficulties.

Psychological Factors: this includes the impact of completion effect, from Approach Avoidance Theory, in terms of gaining valuable credit which the IS senior management will receive when it comes to a project's success. Additionally, on the impact of self-justification attitude by the senior IS development management (e.g. meeting earlier promises) in terms of saving face and dignity. This is regardless of the consequences and the resulted escalation of commitment.

Social Factors: which is represented by the existing competition between the involved actors in the project? For instance the interference of senior management in the IS project manager's role, to present them as the owner of the success, the poor relationship because of the managerial privileges the IS project manager has over the developers, in addition to the exploitation of the relationship the customer has with the IS senior management in order to interfere with project management duties in order to gain increased benefits which might be other than project success.

Organisational Factors: in a way this includes the impact of the other internal departments in the IS development organisation working on the

project. For example the lack of support to the IS product due to violation in the security or quality standards within the organisation.

It appears in most of the identified reasons in this study fit within the categories of (Staw and Ross, 1987) as factors that have a direct impact on project outcomes. The analysis of this study investigated the relationship between these reasons, and then clarified how each one may impact on others. Furthermore some of these have a direct impact on project escalation (e.g. workload, lack of resources) while others may impact on other reasons (e.g. the reason of unclear ideas leads to workload). Thus, it seems this study complements the previous literature by introducing the relationship between the mentioned factors. For example, the social factors, which occurred between the senior management with the role of IS project manager to monopolise the credit of project success, may lead to create project factors in terms of the negative impact on planning and operation. Another example, the organisational factors, which happened because the IS product violated the security standards of the organisation, leads to project factors in terms of the delay occurred by an outsourced party.

Regarding the addressed psychological theories which were used to explain how project escalation evolves, the findings of this study found evidence with respect to Self-Justification Theory and Approach Avoidance Theory in terms of the IS senior management attitude as previously explained in the psychological factors. This study's finding addressed the IS senior management as the responsible actor which suffered the mentioned psychological issues, rather than the IS project manager as assumed by previous studies. Thus it seems the interviewed IS project managers were trying to avoid stating their involvement by blaming their senior management. Therefore, this complements and expands the effect of these psychological theories to include more actors other than the IS project managers, though both of them are on the agent side.

Additionally, the customer responses presented evidence with respect to the impact of the standard Agency Theory, in terms of the resulted information

asymmetry as the customer (Principal) is less able to track or monitor the development progress, so they are misled by inaccurate developers' reports. Actually this point, in addition to the reasons behind project escalation and the way to deal with these according to the customers' viewpoint, covered a number of the challenges in the relationship between the principal and the agent which are mentioned in the literature. This includes, first Adverse Selection, as the customer discovers later the lack of developers' experience with respect to IS development, and the poor planning and resources estimation, further, such issues were not that clear at the beginning of the project. Second, Moral Hazard, which occurred due to the lack of the developers commitment in terms of the inaccurate developers' reports which did not reflect the actual work achieved. Third, Hold-up, this occurs when it comes to dealing with an escalation situation, as the customer sometimes keeps the project running regardless of the huge increment in cost and late delivery, because the chance of completion is better than rejecting the project and starting over with another IS development agent.

When shedding light on the IS project managers' method to detect project escalation, there are three points mentioned here. First, comparing the progress with the original project plan, as any significant increase in the estimated resources (e.g. developers, budgets, and time) could be a sign of escalation, in addition to the role of the project milestones, as a way to confirm whether or not the phases have been completed on time. Second, an increase in the customer's requirements, particularly during and at the end of the development stage, as this may lead to a scope change, which is one of the reasons behind escalation. Third, monitoring the project by a third party (e.g. consulting organisation) or introducing a progress tracking system, which may help to detect any sign of project escalation. In this regard, the first and third methods seem to be mentioned in the study of Kiel et al (2003), in which the study derived a number of constructs for the literature on project management in order to aid differentiating the escalated projects, namely Project Planning which includes checkpoints and deadlines; Project Specification includes the unclear ideas, frequent modifications, and scope changing; Project Estimation

which includes resource guesstimate; Project Monitoring and Control. It seems this study confirmed the impact of these derived constructs, as poor planning and underestimating resources as reasons behind IS project escalation, in addition to the impact of unclear ideas as a form of poor project specification. Furthermore, this study supported the use of project plans and monitoring when it came to detecting the escalation. Actually this confirmation was expected as both studies, this one and Kiel et al (2003), employed the knowledge from the field of project management. However, this study provided more details with respect to the mentioned constructs and how to explain their impact in more than one way (e.g. as reasons and indicators to detect project escalation).

When checking the process of IS project escalation model which developed by Mahring and Keil (2008), that model identified two uncertain elements which have an influence in an early stage (i.e. Drift). These elements are project charter ambiguity, and the conflict of project goal and direction. Furthermore, such elements are referred to the lack of a clear outcome definition and what should be accomplished, in addition to the impact of vagueness and deviation in a project's perception and future. Moreover, the findings of that study suggest escalation may occur as a result of the continual ineffective handling of difficulties that present themselves while the project is running, besides, frequent mismatching remedies with problems will increase escalation behaviour, In particular, the signs of escalation can be seen in the early stages when a project is framed. In this respect, the findings of this study mention the unclear ideas as a significant reasons behind project escalation, which starts early on during requirements gathering phase. This study's findings described how the project situation developed while the project was running, in terms of how the reasons behind both project escalation and unclear ideas impact on each other. Thus, this supports the description of (Drift) phase of Mahring and Keil (2008) model, as the unclear ideas may be a form of project's charter ambiguity. Additionally, such impacts of that factor, it seems to lead to the conflict of project goal and direction. Moreover, considering the early signs of escalation, in terms of the incomplete knowledge transfer by the incompetent principal, in addition to the continual ineffective handling of this

issue would fuel the escalation behaviour. This consideration was initially assumed by this study since the beginning.

Moreover, in response to the mentioned challenge of continual ineffective handling and frequent mismatching remedies with problems that present themselves while the project is running, particularly when reaching the last phase of (Outcome: De-escalation), this study identified and introduced a number of methods to deal with IS project escalation. For example, being prepared to avoid this challenge which includes (e.g. focusing more on the analysis stage, hiring more experienced project managers, doing risk analysis when planning), temporarily stopping the project to accurately assess the situation, and splitting the project into stages or sub-projects to ease the management process. Moreover, while there were no specified actors in the model of Mahring and Keil (2008), this study identified a number of actors who may have an impact on the project and lead to escalation (e.g. customer, developer, IS project manager, IS higher management, other parties).

9.3.1.2 The Various Perceptions of IS Project Escalation

The comparative analysis, which was performed on the IS project managers' responses, reflects the various perceptions of IS project escalation in terms of organisational type (i.e. Governmental or Private). On one hand, the responses of the governmental organisation group 'K.U.' support a particular viewpoint that the development people are employees who work for their own customers, performing the development business as a service. Therefore, even in the case of a project being extended because their customer puts forward unclear ideas or changes the scope of the project, they will keep working until the project is completed, regardless of the increased size of the project. Also, this seems to be the reason why, in 'K.U.', the project managers failed to mention using risk analysis or adding tolerance to time and resources when planning, as a technique to prepare for 'Project Escalation'. At the same time, rejecting the project is not a possibility when dealing with escalation. Therefore, in this type of organisation

> "... generally projects escalate in terms of consuming more and taking longer than what was expected in the plan and needing more resources. To be honest we don't feel danger of such problems, as we are employees in the governmental sector." (PM_26)

Further, as mentioned by a project manager from 'D.L.', it seems that

> "... escalation problems do exist but what they are, how they impact, and how they are dealt with, depend on the nature of the company. I assure you that when it's a governmental company, escalation has a different effect than if it was a private company." (PM_11)

On the other hand, the response of the private organisation as group 'Others' seems more rigorous in terms of following the rules when it comes to gathering the requirements in the initial stage, or adding or changing requirements. Particularly in case these changes may impact on the original project plan. This can be considered to be one of the main differences between the private organisations' group 'Others' and the governmental organisation group.

9.3.1.3 Explaining IS Project Escalation Using Attribution Theory

Worth mentioning, within the responses of the IS project managers in this study, they almost never mentioned the ineffective handling and frequent mismatching remedies with a project's problems, which is the responsibility of the IS project manager. Additionally, there is almost no sign of the impact of Prospect Theory, which suggests escalation may occur as a result of the choices of decision makers or in this case, the IS project manager. Moreover, the study of Keil (1995) pointed out that project escalation probably occurs due to the inaccurate decision-making taken during operation. Further evident suggests that when comparing the reasons of IS project escalation between the viewpoints, as mentioned earlier in this chapter in section 9.2.3, it seems that each party (Principal and Agent) was trying to justify their position, and to defend their responsibility, with respect to the reasons of unclear ideas and project escalation, by blaming and involving the other party. For example, on

one hand, the project managers complained the customer is unable to clarify the ideas in terms that the ideas are general and lack detail, and on the other hand, the customers blamed the developer's lack of experience and their poor analysing skills which led to this vagueness. Another example, the project managers claimed the customer suffers the lack of awareness in terms of developing and using IS products, and the customers replied it was the IS project manager's responsibility to educate them about the process of developing an IS product which include the much needed awareness.

Based on this, it seems possible to introduce an explanation to the performance of IS project escalation, through the concept of attribution theory.

● ***Overview of Attribution Theory***

This theory comes from the literature of Psychology. The theory explains certain behaviours by identifying their causes (Weiner, 1986). Additionally, this theory:

> "represents an extensive examination of the perceived causes that many apply to events involving themselves or others. A central tenet is that people are motivated to render their world controllable and attributions function to achieve a sense of systematic personal control over environmental forces ... Many will perceive causes for success by locating themselves as the key agent in the success – thus in control of, or responsible for successful outcomes. Further, often there is a discounting of their own role in any failure – achieved by explaining away failure events as external to themselves and controlled by external forces" (Standing et al, 2006, p. 1149)

In this respect, Campbell and Sedikides (1999) argue that humans act like amateur scientists in order to make sense of the world and their surroundings. As such, people naturally try to identify cause and effect in situations and events, even if it may not exist. Furthermore, two main ideas are introduced to clarify the attribution behaviour. Firstly, there is an assumption that people act in a certain way due to internal attribution, like being naive or jealous. Secondly, people may act in a certain way due to external attribution (something within the situation or environment). In addition, according to

Weiner (1986), an attribution can be highlighted through a three step process as follows: the behaviour is observable, the behaviour is intentional, and the behaviour is attributed because of internal or external causes.

- ***The Impact of Self-Serving Biases***

Under the umbrella of Attribution Theory comes the concept of Self-Serving Attributional Bias or Self-Serving Biases (SSB). These concepts are concerned with the behaviour of "taking credit for personal success but blaming external factors for personal failure" (Campbell and Sedikides, 1999, p 23). This means a person is more likely to agree to take the responsibility for successful results, and refute the responsibility for failed results (Weiner, 1986). According to Campbell and Sedikides (1999), there are number of factors which influence the behaviour of SSB, the following will describe some of them. Firstly, 'role' reflects the difference in judgement between who is observing and who is acting. So the SSB is the reason for the actor's behaviour, but has no impact on the observer because of other reasons. This means that the effect of SSB is more significant with the actor than with the observer. Secondly, 'task importance' means the observer, who informs on task importance, will exhibit a greater effect of SSB than the participant who believes the task is not that important. Thirdly, 'self-esteem' reflects the need for people to maintain respect and identity. Ultimately, humans who have high levels of self-esteem are likely to show more SSB than those with low levels. Fourthly, 'Locus of control' is concerned with internal or external attribution. Here, people with internal or personal attribution traits believe their own actions affect situations or states. Conversely, people with external attribution traits believe that outside events, rather than their own actions, affect things. So, people with external locus attribution traits are more heavily influenced by SSB than the other group.

● ***Explaining IS Project Escalation***

According to above discussion, it is possible to say the escalation occurs due to the inexperience of dealing with project challenges, which includes for example the lack of details with respect to ideas, the lack of a customer's awareness in terms of developing IS products, and the continual requirements' adding particularly in later project stages. Such challenges would compound and negatively impact on project operation and outcomes. This inexperience was ignored by the developers or by the IS project manager under the pretext these challenges were not their responsibility, as these challenges evolved because of another party's mistakes (i.e. the customer). In which, this inexperience reflects the signs of external attribution, and presents the effect of SSB concept.

Employing attribution theory is used previously within the context of a project's failure (e.g. (Standing et al, 2006) and (Peterson et al, 2002)). To the author's knowledge, this study used attribution theory for the first time within the context of IS project escalation.

9.3.1.4 Factors negatively impact on project operation and outcome

The analysis in both data collection stages identified a number of reasons behind the challenges of (Unclear ideas) and (Project escalation). In order to emphasis the meaning and to avoid repetition amongst the main themes within the construct of (Project Escalation) in the analysis of the first stage of data collection, these reasons were divided between the main themes of (Actors behind project escalation) and (Reasons behind project escalation). This division led to separating some reasons and attaching them directly to the responsible actor. For example, according to the IS project managers, having a hidden agenda beyond project success is a reason behind project escalation. However the analysis put it within the impact of the customer as an actor behind project escalation. Doing this separation later was quite useful when investigating the relationship between the themes and when creating the influence diagrams. Besides, the remaining analysis was built on this division of themes from the first round of the analysis.

Another point, considering the impact of all these reasons s from both stages of data collection, as clarified in the narratives in sections 5.2.2 and 6.2.2, the following Table 9.1 shows them as 29 factors which negatively impact on project operation and outcome.

Table 9.1: Factors Negatively Impact on Project Operation and Outcome

Factors
● Customer is unable to clarify his ideas ● Customer's lack of communication ● The incompetency of customer's knowledge source ● Customer's multiple knowledge sources contradicts ● The customer keeps adding requirements ● Inaccurate expectation because of the developers (not using the prototype) ● Being tricked by developers (Breaking verbal promises) ● Developers' inadequate analysis ● The nature of IS development ● The project manager's lack of experience and qualifications ● Unidentified duties and responsibilities of the project manager ● Poor relationship between the project manager and developers ● The developers learn new technology during working ● Educating the recent added developer about the project ideas ● Lack of a developer's experience and commitment ● Developers' individual differences ● Lack of supporting developers by the IS senior Management ● The existence of corruption and hidden agenda at the IS senior Management ● The IS senior Management Overlaps functions within the managerial hierarchy ● The IS senior management adds pressures in time and resources ● Customer has a hidden agenda beyond project success ● Customer's lack of awareness in terms of developing and using IS products ● Poor planning and operation ● Lack of human resources ● Workload ● Unclear ideas ● Scope changing ● Project size is too large ● Poor contract

Source: Developed by the author

It's not surprising that a number of these factors are mentioned in other studies about critical failure factors in ERP projects. For example, Inexperience

of project leader, Inadequate training for the team members, Lack of team member commitment, and Little use of a prototype (Peterson et al, 2002). This is because all these factors within this research and other studies focus on what challenges the success of IS development project in general. However, this research confirmed them and identified their impacts within the context of investigating IS project escalation.

9.3.2 Knowledge Transfer in IS Development Projects

9.3.2.1 The Issue of Unclear Ideas

Regarding the construct of (Knowledge Transfer), based on the responses of IS project managers and customers, it included a number of themes which discussed the following: Factors facilitating knowledge transfer, Knowledge transfer techniques, The effect of clear ideas and requirements, Reasons behind unclear ideas and requirements, The impact of unclear ideas and requirements, Detecting unclear ideas, and Dealing with unclear ideas. Furthermore, the related narrative provided further detail in respect to these mentioned ideas. Additionally, as the process of RE starts at an early stage in the IS development project, which involves various knowledge transfer methods between the customer (principal) and the developers (agent), its impact is evident during the remaining project stages (e.g. development, testing) in terms of the extent these ideas are clear, because everything seems to be based on the outcome of the RE stage. Thus, a number of negative consequences of unclear ideas is mentioned, for instance poor quality of the IS product, poor customer satisfaction, the inaccurate planning in terms of the needed time and resources, more modifications and fixes are expected later which requires spending extra effort and adding more resources (i.e. increase in cost). Additionally, a number of the project managers' responses suggest that project escalation could be another crucial result because of these mentioned impacts of unclear ideas. Thus, this seems to confirm this research's assumption in terms that there is a link between the issue of project escalation and the unclear ideas of the customer.

9.3.2.2 The Responsible Actor of Unclear Ideas

When discussing the reasons behind unclear ideas, on the one hand, a number of these reasons presented the responsibility of the developers (agent), for instance the inadequate requirements analysis, the failure of managing customers' expectation (i.e. not using the prototype), and tricking the customer by false pretence of understanding the requirements or breaking verbal promises. Such reasons it seems may be possible to define them as agency challenges in terms of Adverse Selection as the customer (principal) discovers later the lack of developers' (agent) experience with the RE process. And in terms of Moral Hazard because of the lack of developers' (agent) commitment to fill the lack of developers commitment in terms of the inaccurate developers' reports of understanding and achieving the requirements. On the other hand, through customers' responses and replies, there is evidence with respect to the impact of the customer (principal) as a responsible actor for the issue of unclear ideas, for instance the customer is unable to clarify the ideas, customer's lack of communication, the incompetency of the customer's knowledge source, customer's multiple knowledge sources, and the customer continues to add on-going requirements. This seems to support the research's assumption, in terms of the impact of the incompetent customer (principal) when it comes to the transfer of the knowledge to the developers (agent). Therefore, this provided further explanation with respect to the phenomenon of IS project escalation using an extension to agency theory.

9.3.2.3 The Roles of Objects in Knowledge Transfer within RE Process

Considering the theoretical part, investigating the process of RE within the IS development project led to identify a number of relevant knowledge artefacts, namely Initial Request, Features, Process Diagrams, Prototype, and Requirements. Hence, it seems the knowledge of the customer took a number of forms during this process. Moreover, in step-1, the artefact of 'Initial Request', which is created and filled by the customer at the beginning, does not appear to have a rich amount of data, as it only seemed to aid preparation for

the next steps (e.g. selecting an experienced project manager, attend suitable training). In step-2, the artefact of 'Features' includes a large amount of detail and descriptions, as described according to the customer's understanding, as it contains the customer's presentation slides, sample of reports, sketches and transcribed replies to developers inquiries. Then in step-3, the set of materials of 'Features' artefact is represented in a drawing format and the 'Process Diagram' artefact, which is a favourite technique the developers use to clarify customer ideas in terms of the desired procedure which the proposed IS product should follow. Next in step-4, the same knowledge takes another on-screen shape as the 'Prototype'. The 'Prototype is the expected GUI screens with almost no serious coding, so the customer can use it and interact with it, and The final IS product should look and react in the same way as the prototype. In step-5, developers' artefact of 'Requirements' document is produced. Worth mentioning, the process can be repeated from step-2 to step-5 which includes involving the prototype in the JAD-sessions. This may lead to improvements in the visual diagrams and the prototype according to the customer's suggestions during each meeting. Lastly, signing the finalised release of 'Requirements' document by the customer reflects acknowledgment of the customer's ideas, and gives the trigger to start the actual programming phase.

Based on this, the following will shed light on the role of each artefact as object.

- ***Boundary Object***

It seems the 'Process Diagram' and 'Prototype' artefacts are another form of the 'Features' artefact which have the same knowledge of the customer's ideas. To expand this point, the set of joint papers which were filled with text and simple sketches and were provided by the customer within the 'Features' artefact, signifies the customer's knowledge. This set of materials is then translated into a set of meaningful drawings for the developers (i.e. 'Process Diagram' artefact). At the same time, though customer interaction with this object is unexpected, the fact that it occasionally happens, supports its

function as a boundary object. So, the same knowledge of the customer appeared here in two different shapes..

> "Most of the time I work with the developers to create the process diagram, the customer can help us in case he has a reasonable idea which is not a common occurrence." (PM_7)

The same concept occurs with the 'Prototype' in terms this artefact is a transformation of the 'Process Diagram' artefact , reflecting the developers' understanding in regards to the knowledge gained at the first stage. So, this knowledge is transformed from meaningful drawings for the developers into a prototype which the customer can then see on screen and interact with.

Therefore, it is possible to say these two artefacts function as a boundary object by presenting in more than a form, in terms of the same knowledge of the customer is appeared in two different shapes.

Thus, as mentioned by Nicolini et al (2012) this feature of multiplicity aids these boundary objects to act as a translator between the involved parties. Additionally, because these boundary objects keep details which both parties can understand and interact with, at each stage a boundary object determines what is required to be learnt through the boundary. This means it seems there is no critical need for each party to completely cover the context of use because a boundary object mediates between these two parties.

When considering the aspect of 'dependencies', which concerns with how two involvements form different practices count on each other to achieve the target (Carlile, 2004), a sign for this aspect presents in the cooperation between the customer and the developers in terms of that the customer points out the mistakes or ambiguity in the requirements when this customer testing the prototype.

> "Sometimes it's good to take the prototype to the JAD sessions and start the process over again; this helps to have a better understanding to negotiate with the customer of course this in turn will improve the UML diagrams and the prototype." (PM_15)

> "We see an improved version of this prototype based on our comments during the periodic review meetings, because in these meetings we discuss the project progress and problems, which include our comments regarding the prototype, by doing so this we can verify our requirements." (Customer_07)

In other words, the function of the 'Prototype' artefact on the computer screen as a boundary object and how it was gradually transformed from the written data within the 'Features' artefact, impacts and changes what was learned across the boundaries. So, this form of prototype on the computer screen formed the collaboration between the developers and the customers.

- ***Epistemic Objects***

Emphasizing the role of boundary object in the process of knowledge transfer seems to inform the work across boundaries in terms of the effort provided by each party. Furthermore, to provide a better understanding of the concept of the epistemic object appears to be helpful, as it provides a source of motivation which influences perusing and finding out what is not yet known. A reasonable example from IS development practice of an object which acts as a motivation is the 'Process Diagram', as mentioned by the IS project managers:

> "Later, we met without the customer to analyse his ideas. We drew a model diagram which represented the business model using UML and flow charts. We then run some business cases to simulate the process." (PM_15)

> "It is just few sketches to close the idea to our minds using UML, so we can understand it better by imaging the different situations and how they run. This should happen before creating the prototype." (PM_27)

> "These drawings clarify the picture, maybe they only appear to be arrows and symbols, but they are useful to discover what is missing, so we can ask more questions about the consequences." (PM_13)

These quotations resemble a situation in which there is a need to clarify the customer's knowledge in a better way than what is written in the 'Features' artefact Therefore, it seems this need is motivated by the remained unfulfilled knowledge and understanding. Furthermore, it is possible to assume the

developers spend more effort and arrange another meeting later without the customer under the sensual influence of objects' lack of completeness. Moreover, through the knowledge transfer process, this epistemic object seems to remain in the middle between the written data of the 'Features' and the 'Prototype' on the computer screen. Therefore, with each repetition, where the knowledge becomes closer to being absorbed, this may add more options and significantly push the process forward. Moreover, this lack of completeness from the epistemic object leads to more queries being generated, in terms of the newly figured scenarios the IS product can follow. This in turn, creates more queries about the consequences. So, this process of creating the epistemic object of 'Process Diagram', as expressed by Cetina (1997), is a sociality and object centred procedure which builds on the reciprocity among the professional subject and objects. Although the customer interaction with these drawings is not that expected, only a few IS project managers mentioned that the customer may understand these drawings, where the customer has a reasonable idea or experience which allow providing hints to improve these drawings.

- ***Activity objects***

According to Nicolini et al (2012), in addition to the characteristic of the epistemic object in terms of providing motivation and the characteristic of boundary object in terms of translating the meaning, the activity objects is known by its emergence nature, and by it initiating the negotiation and contradiction. Within the practice of IS development, there are two artefacts that may function as activity objects, namely 'Prototype' and 'Requirements' artefacts.

Thinking about the 'Prototype' on a computer screen, the projected design (i.e. GUI) of this artefact and the continuous alignment of the involved parties to figure it out are emerged at the earlier RE stage. Thus, with each meeting and discussion, this artefact is changing to reflect the needs and purposes of the customer. At the same time, this artefact is very similar to the

final product in terms of the screen designs and the sequences it follows. Actually these screens represent how the proposed IS product should look and perform, as is the outcome of this practice.

> "We are trying to figure out what the customer wants according to his imagination, so this prototype helps a lot as it can reflect the customer's expectations as we understand them ... the screen designs and the process sequence are changing and become more accurate with each round of meetings." (PM_17)

> "During the meeting we draw some sketches for the user screens. So in the next meeting they will create a prototype based on our sketches and notes." (Customer_04)

> "I liked the discussion using the prototype. I will now know exactly what to expect later." (Customer_05)

Moreover, the practice of IS development involves other parties in addition to the developers and the customer, like people from quality assurance and security departments. In this respect, each party has its own interests during the project, in which these interests should be maintained but not eliminated. So, the effect of such interests may impact on the imagined or suggested design of the prototype, and on the eventual prototype which represents the final products, for example:

> "The security department added some obstacles and delayed the deployment, besides the administrative issues with their department" (PM_21)

> "Because some features did not align with security standards, the quality assurance department forced us to modify the prototype and the requirements document." (PM_26)

Furthermore, it appears that Activity object embedded various elements within its material in which this happens when it exists in the real world, as this allows involved parties to interact with. Therefore, it progressed from being an imaginary concept into a form on the computer screen. As a result of this object's content of various elements (e.g. beliefs, tools, abilities) which belong to various professions, it opens doors for negotiation and present contradictions

in terms of the compatibility with the customer's requirements and needs, and in terms of its agreement with the developers understandings and quality standards. Hence, this presents the 'Prototype' as works space to deal with challenges.

> "Through reviewing the sequence of these prototypes' screens on the computer, I can easily point out the problems." (Customer_09)

Moreover, such issues resulted because of the contradiction in the activity object, they may stimulate extensive learning, for example:

> "When the customer tested the prototype, at one of the GUI screens, he asked for a lengthier text input field which exceeded our ability to store and retrieve on the database [it is a technical issue], at the same time storing the data in this condition was important to run other functions like searching and replacing the stored text. So we had to ask for help and introduced a database management expert to teach us how to deal with this situation." (P.M. 25)

Such a contradiction led to add more developers and relatively reorganised their importance in terms of the experience. In addition it changed one of the prototype aspects. In other words, the prototype allowed for the introduction of new conditions because of an emergent situation, which makes it appear to be an endless source for learning and change.

Worth mentioning, the document of 'Requirements' artefact has the same impact as the 'Prototype' artefact. Furthermore, it receives the same changes and modification as well. This happens because the reaction with the prototype is declared in the requirements document at each meeting or discussion between the involved parties. This document is the outcome of the collaborative work during the RE process between the involved parties, which the customer should acknowledge by signing the contract that includes a hard copy of this document of requirements.

> "Because some features did not align with security standards, the quality assurance department forced us to modify the prototype and the requirements document." (P.M. 26)

> "We see an improved version of this prototype and the requirements documents based on our comments during the periodic review meetings…" (Customer_07)

According to what was previously mentioned, this discussion theoretically developed a novel framework to categorise the knowledge artefact as an object based on the role they perform within the knowledge transfer process. Moreover, this reflects how the practice of IS development impacts on the shape and function, which each object performs during RE activity.

9.4 Analysing a Number of IS Development Projects Cases, and the Significance of the Role of Knowledge Artefacts

In the beginning of this research, the perspective of Agency Theory offered an overarching theoretical perspective to investigate the phenomenon of IS project escalation. Ultimately, this perspective emphasises that dealing with such a phenomenon requires addressing information asymmetry, which occurs due to the challenge of incomplete knowledge transfer at the principal side. Investigating the role of incorporated knowledge artefacts presents an effective solution for this challenge. Building on this perspective, this research progressed and developed Project Escalation and Knowledge Transfer Frameworks using empirical evidence derived from the experiences of a number of IS project managers and customers. In chapter 8, these two frameworks are used to analyse different IS project cases. These cases covered a number of contexts, for example warehouse storage systems, human resource management systems, financial management systems, online library borrowing system, and online hotel reservation systems.

Eventually, Project Escalation Framework exhibited multiple practical applications with respect to managing issues building up to and leading to several project outcomes. Additionally, the knowledge artefacts in Knowledge Transfer Framework presented themselves as critical linchpins of an otherwise fragmented process when it comes to eliciting the requirements. Furthermore, these two frameworks highlighted the critical link between the specific

outcomes of the knowledge transfer process (i.e. complete, incomplete) and IS development practice (i.e. success, failure, and escalation).

For example, in the case of the warehouse storage system project, short-cutting the suggested steps to transfer knowledge and neglecting a number of artefacts led to incomplete knowledge transfer. Dealing with this situation led to iteratively gathering the requirements and modifying codes numerous of times (thus escalation).

Another example is the case of the human resource management system project. This project mainly failed due to a lack of requirement clarity. In this respect, the procedures followed to transfer knowledge in this project eventually skipped creating a 'Process Diagram' artefact, which resulted in incomplete knowledge transfer.

Furthermore, in the case of the online hotel reservation system (a successful IS development project), knowledge transfer progressed through all appropriate steps and employed the mentioned five artefacts in the Knowledge Transfer Framework. Hence, knowledge was completely transferred in this project.

Based on these illustrative projects examples, the result of the chapter 9 analysis set more focus on the crucial impact of transferred knowledge due to its significant relationships with IS project outcomes. That is the analysis of a number of IS development project cases showing that utilising these knowledge artefacts in the right and effective way (i.e. inclusion) contributes to the success of the project (i.e. the impact of CSFs). Also, using the same concept, mis-utilising or missing one or more of these knowledge artefacts (i.e. omission) contributes to the failure of the project (i.e. the impact of CFFs). Furthermore, these critical functions of such artefacts highlight that knowledge has further implications that go beyond project escalation. In other words, learning the roles of the incorporated knowledge artefacts in the Knowledge Transfer Framework serves a broader purpose than just enabling customer requirements to be elicited.

According to the above discussion, employing Agency Theory to illustrate the investigation in this research has led to broader understandings with respect to the role of the identified knowledge artefact in the Knowledge Transfer Framework. Consequently, this understanding will result in improvement of IS development investigation in general, rather than exclusively enhance RE processes between the principal and agent.

9.5 Answering Research Questions

There are a lot of analysis findings and discussion results. The following summarises the main points, through the analysis and discussion, which addresses the research questions.

Question 1: *What evidence is there of conflict and contradiction by the customer, in terms of knowledge transferring to the IS developers? And what are its impacts in terms of project outcome and project operation?*

The analysis presents a number of actors who have an impact on the process of knowledge transfer during RE stage, and the customer is one of these actors. The customer's impacts were stated within the main themes of (Reasons behind unclear ideas and requirements) as mentioned by the interviewees in both data collections and analysis stages, which includes the inability to clarify the ideas, lack of communication, the incompetency of the knowledge source, the contradictions of multiple knowledge sources, and the keeping adding of requirements. Then, the narrative provided more explanation with respect to each of these impacts.

During the first round of analysis, some of the unclear ideas consequences are considered. The theme of (The impact of unclear ideas and requirements) presented some of them which included Product's poor quality, Negligence when using the product, Failure of the project, Increase in the cost, time and effort. Then, the further analysis described the link between unclear ideas and other challenging factors. Moreover, the influence diagram of the relationship between the reasons of unclear ideas and the project escalation

shows that unclear ideas has a direct impact which leads to poor planning and operation, at the same time, unclear ideas has a number of indirect impacts on other reasons of project escalation which includes ‘Scope changing’, ‘Workload’, and ‘Lack of human resources’. This suggests the challenge of unclear ideas’ has more impact than the other reasons which leads to project escalation. Unsurprisingly, such a challenge scored the highest frequency by 87% as one of the main reasons of project escalation in the first data collection stage.

Though the involvement and the impact of other actors with respect to the challenges of unclear ideas and project escalation, the evidences in the analysis confirm the assumption at the beginning of the research that in terms it assumed the incompetency of the customer when it comes to transferring the knowledge to the developers. Thus, this research provided and confirmed a new perspective to investigate project escalation through employing a framework by the extended agency theory, as explained earlier.

Question 2: *What form of knowledge transfer is evident between customers and developers, in terms of the practical techniques and tools provided by the project manager and developers?*

When this research began, it suggested learning from the successful RE applications in terms of investigating the roles of knowledge artefacts within the practice itself, as one of the possible and recommended ways to provide a solution to the challenge of unclear ideas. Therefore, the first round of analysis and the narrative presented a brief version of the RE process to retrieve a customer’s knowledge. Then, the later analysis focused more on the role of knowledge artefact as an object to facilitate knowledge flow between the involved actors. Additionally, the analysis comprehensively explained them in five clear steps in which each step described how to use the current artefact, that it represented, how to use it to create the next artefact, and who are the involved actors during this process. Later, the discussion clarified the roles of each one of these knowledge artefacts acts as object.

Additionally, analysing a number of IS development project cases chapter 9 pointed out the significance of following the suggested five steps when it comes to effectively elicit customers' ideas. Furthermore, empirical evidences suggest missing one of these steps is probably leads to a situation of incomplete knowledge transfer.

Consequently, this reflects the significant usability of using tools and methods from the practice of project management. To expand on this point, these artefacts manage to embed the knowledge at each step, and then, their change in form and shape in the next step works like a checking point to verify their content. This happens gradually at various steps to suit and allow the interaction of all involved parties, until it reaches the final form of the Requirements document which is included in the contract. At this stage, the customer should confirm the transferred knowledge by signing the contract. Therefore, as previously mentioned in the discussion, dealing with this challenge of incomplete knowledge transfer is critical in dealing with IS project escalation in the first place. Hence, this research provides a further perspective from which to investigate and deal with this topic.

9.6 Justifiability and Transferability of this Research

As discussed in section 4.4.5, instead of relying on the concepts of reliability, validity, and generalisability traditionally associated with quantitative approaches, the qualitative approach has significant alternatives. They are "Justifiability" and "Transferability" (Auerbach and Silverstein, 2003).

This research achieved "Justifiability" by carrying out certain procedures. Firstly, this research was **transparent** with respect to the ability to track the steps followed to reach the findings. These steps included categorising themes and constructs from the raw data as they built up out of repetitive ideas. These themes were prioritised by using quantifying methods, identifying the differences between various viewpoints by using comparative methods, figuring out the relationship between the themes, and identifying the

five steps to describe knowledge transfer by presenting the evidence in the data. In addition, the diagrams with respect to the Project Escalation Framework the Knowledge Transfer Framework were based on the result of previous analysis. Secondly, this research was **communicable** as the identified theme provided sensible points of view. Additionally, the description of each theme is written clearly and in a very digestible style. This clarity covers the main construct, the main themes, and all related sub-themes. Moreover, the author was able to explain these themes through gaining approval to participate in a number of conferences, and presenting a number of papers and posters about this research and its findings. Thirdly, this research demonstrated **coherence**. In this respect, resulting narratives in this research combined all the constructs and themes, and linked their ideas to provide a number of coherent stories with respect to project escalation and knowledge transfer in IS development practice. Though the findings in this research represents one possible way to analyse the data, 'justifiability' focuses on the simplicity of applied methods in reaching these findings, and on the ease of understanding themes and constructs, and on the rationality to form the data.

The concept of 'transferability' in concerned with the existence of similar abstract themes when studying different samples, regardless of the deeper details of each of the inner themes, which differ according to the samples themselves. In this respect, this research presented 'transferability' in the following ways.

Firstly, the data was collected in two stages, in which each stage involved a number of interviews with different samples. In this respect, the discussion in section 9.2 (which compared the responses between IS project managers and the customers) highlighted an acknowledgement of a number of aspects between the viewpoints of the two samples. These aspects cover for instance: the applied procedures during RE processes and the reasons behind IS project escalation and unclear ideas. This acknowledgement provides crucial signs of 'transferability' with respect to the findings, in terms of the similarity between the inducted themes by analysing the data of two different samples.

Secondly, as discussed in section 9.3.1.4 (factors that negatively impact on project operation and outcome), a number of reasons behind IS project escalation and Unclear ideas were previously mentioned in other studies as critical failure factors (CFFs) in ERP projects. At the same time, the analysis in chapter 9 highlighted the significance of using these reasons to investigate project failure in IS development practice, or even to investigate project success when reversing these reasons to act as critical success factors (CSFs). This suggests that the identified reasons behind IS project escalation and unclear ideas share the 'transferability' with a number of previous studies in terms of repeating the critical failure factors and critical success factors.

9.7 Conclusion

This chapter presented an overview of the research's core findings of the analysis. At the beginning, it compared between the outcomes of each stage of data collection. Then, it linked and discussed the data analyses with the related reviewed literature. Later, it provided answers to research questions. The next chapter will discuss the contributions, implications, and limitations of the research. Additionally, it will draw a number of recommendations from the current research and provide conclusions.

Chapter 10: Conclusion and Recommendations

10.1 Introduction

In this chapter a number of recommendations are provided to support the field of IS development in response to the recently reported problematic and failed projects. In particular, those escalated projects which are often due to a misunderstanding of a customer's requirements. The practical and theoretical implications of the research are then highlighted. Finally, the research limitations and recommended future research directions are discussed.

10.2 Implications and Contributions

This research indicated a number of findings with respect to the challenges of project escalation and unclear ideas in the field of IS development projects. Additionally, by using qualitative methodology and by analysing the interviews with a number of IS project managers and customers in Saudi Arabia, the outcomes have clarified the understanding with respect to the relationship between these two challenges.

The findings of the research have practical implications for the practice of IS development, and have theoretical contributions to research methodology and to the available literature on IS project escalation and knowledge transfer within the same field. The next section will discuss these implications and contributions.

10.2.1 Practical Implication

Research into the practice of IS development in terms of the challenges facing this profession seems quite crucial from both a practical implication and a theoretical perspective. In this respect, the following will discuss a number of these as reported by the research outcomes..

The findings stated in this research lead to a number of valuable implications for general practice. Though numerous organisations and governments have been increasingly investing in IS development products and solutions, the reported rate of problematic IS development projects seems significant. Additionally, what worsens the situation for some of these projects is the continuous consumption of resources without achieving targets. Without calling a stop or putting appropriate management checks in place, this can lead to problems escalating. This is known as project escalation, in particular where these projects are due to an inaccurate understanding of customers' requirements. In this respect, the waste associated with the challenges of IS projects has been estimated at "billions of dollars" annually.

In response, this research provides some useful awareness for IS managers in terms of identifying the reasons behind project escalation, how to detect it, and what the best practice is when it comes to dealing with it. Moreover, this research presents the factors and practices that facilitate knowledge transfer between the customer and the developers, identifies the reasons of customers' unclear ideas and its impact on project planning and outputs, and how to deal with the issue of unclear ideas. Such hints and recommendations derived from the research's findings, provide some valuable insight when it comes to making decisions on dealing with problematic IS development projects and knowledge transfer when considering the challenge of project escalation.

Moreover, the development of (influence diagram of the relationship between the reasons behind unclear ideas and the project escalation) outlines the awareness with respect to these reasons for IS practitioners. Thus, recognising the impact of each of these reasons should afford a more careful and cautious scheme which should positively reflect on the process of IS development. Additionally, the suggested (process model for knowledge transfer in IS development projects) offers a useful guideline in terms of how to significantly utilise the mentioned techniques and tools at each step, which lead to establishing an effective strategy for RE processes in such projects.

Another point, although the developers' perceptions with respect of dealing with project escalation challenge seems to be the same through various IS development organisations, the empirical investigations suggest their response is different and depends on the organisation type in terms of whether it is governmental or private. As previously discussed in section 9.3.1.2, this refers to the nature of governmental organisations in which their developers are committing to complete the IS development project regardless of the increased size of the project. On the contrary, private organisations are more rigorous in terms of following the rules and preventing later changes, particularly those occurred by the customer. Recognising such aspects provides a more comprehensive understanding with respect to an organisation's performance, particularly when investigating the reasons of such challenges, in addition to how to appropriately manage and deal with them according to each organisation's type.

In this research, the empirical evidence suggests that the effective knowledge transfer from the customer to the developers during RE stage is considered to be a crucial step to success for the IS development project, as it represents the base for the rest of the project to be built from. At the same time, the failure or incomplete knowledge transfer seems to lead to critically, unfortunate results with a likely chance to escalate the project. Thus, it is significant to recommend setting more focus in terms of spending sufficient time and effort during the stage of requirement gathering and analysis. Actually, spending additional effort in the early project stages of RE might be the key to avoid or to effectively deal with later challenges, which saves a lot of effort in fixing or modifying the code. Moreover, is how crucial the role of knowledge transfer is in IS development. This research advocates investing to prepare and to train the developers in order to achieve effective knowledge transfer skills and abilities to reflect positively on IS project operation and outcomes. Hence, by doing so, this offers the developers to efficiently scrutinise the rest of the development process and to build the IS product on a stronger base of gained knowledge.

Additionally, this research illustrates a number of techniques and methods in response to a project escalation situation, in this particular, it seems quite important to be prepared for this challenge from the beginning. Also, in addition to the reviewed literature, the empirical evidence suggests that although the high level of professionalism in terms of managing and operating an IS development project, there is still the chance for the occurrence of escalation for various and unexpected reasons, as discussed in the analysis. Therefore, this research highlights the importance of utilising the preparation mechanisms in order to be ready for any challenges in case they are presented, which in turn should increase the chances to effectively handle them and impact positively on project operation and outcomes.

Additionally, this research illustrated the expected roles for the involved actors in an IS development project, to be exact the developers (agent) and the customers (principals). Furthermore, evidence in respect to the impact of both actors is identified. This means that no one is totally to blame for the challenges a project might face and that actually each one of these actors is responsible to a certain extent. Thus, based on the findings of this research, it is recommended that the customer spends a sufficient amount of time and effort to seek a trustworthy and reliable IS development organisation. Additionally, to not being tricked with inaccurate advertisements or cheap prices, as this may lead to potential cost consequences in the case of an escalation. Regarding the developers, this research encourages the establishment of a transparent and trustful relationship with the customer. Also, it seems crucial to discuss project challenges with the customer in order to significantly solve and deal with these, and of course, this includes the knowledge transfer issues. More importantly, the requirement document and contract are the vital reference for actors, hence, refining and reviewing these documents is high encouraged by this research.

The demand on IS solution products is increasing daily by governments and organisations, so the IS development industry represents a huge investment. Considering the reported rate of problematic projects and the huge associated costs, it is hoped that the results of this research will support and aid

IS project managers in terms of effectively managing and dealing with the potential challenges of project escalation and unclear ideas which threaten IS development practice. Thus, by offering a comprehensive list of suggestions and advice, and by presenting the awareness with respect to the possible obstacles and issues, this should maximise the chance of project success, which can save escalating costs and save "billions of dollars" annually because of the problematic and failed project. In conclusion, such expected benefits should positively reflect on the industry of IS development in particular, and on the economy in general.

10.2.2 Theoretical Implications and Filling the Research Gap

This research has contributed to various aspects of the current, available literature. The presented findings to IS project escalation, knowledge transfer, and the relationship between these have been empirically examined through a qualitative analysis from a triangulation of data sources, namely the IS project managers and the customers. Through conducting a number of semi-structured interviews this allowed an in-depth discussion and the involvement of various opinions which includes new issues not already considered. Furthermore, the data analysis was guided by the initial proposed conceptual framework and assumptions. Hence, this permitted the author to conduct the analysis with prior specific expectations. At the same time, this gave a chance for the emergence of other unexpected explanations and issues.

In terms of the existing literature, this research supported and complemented a number of their results. First, in addition to fitting most of the identified project escalation reasons within the four determinants factors of Staw and Ross (1987), this research clarified the relationship between these mentioned factors and identified their impact on each other. Second, this research found evidence in respect to the impact of previously employed psychological theories to explain the project escalation evolvement, then, the findings expanded the psychological impact to include more actors, other than the obvious ones. Third, this research's findings declared the effect of the

standard agency theory, which in turn highlighted a number of the challenges in the relationship between the principal and the agent which is mentioned in the literature. Fourth, regarding the process model of Mahring and Keil (2008), according to the identified evidence, this research was able to suitably run that model through applying the issues of unclear ideas at the beginning, and then tracked its development through the rest of model's levels. Additionally, there was no significant contradiction between this research's findings and the reviewed literature. Therefore one part of this research's contribution is its support of the findings of the previously reviewed literature. However, this research achieved that through providing a different way of empirically testing these aspects by doing the investigation based on the proposed framework, and by interviewing both the IS project managers (agent) and the customer (principal). Furthermore, the findings of this research were achieved within the context of IS project escalation through the empirical application in a number of organisations in Saudi Arabia. This reveals that investigating IS development in Saudi Arabia seems not to be that different in terms of the theoretical findings compared with similar studies in other places.

Furthermore, considering the achievement of "transferability" as discussed in Section 9.6 which focuses on the existence of similar abstract or general themes when studying different samples, this achievement suggests that the findings of this research are highly likely to extend beyond the samples of people and organisations studied here. In turn, this means that the theoretical contribution and recommendations of this research should relate to future studies in a range of different contexts using other people and business samples.

Considering the identified gap in the literature through the application of agency theory, in terms of the implicitly adopted assumption by previous studies that the issue of project escalation is only occurring because of the attitude of developer (agent) which ignored the impact of the customer (principal) at all, this research took the initiative and responded toward that gap. Hence, this research provided a new explanation which highlights the role of the customer (principal) this time. In this respect, a number of significant

evidence were empirically figure out. In which these evidences acknowledged the customer's tolerance of knowledge transfer incompetency in terms of declaring the ideas and requirements to the developers, which was originally assumed by this research. Therefore, this research addressed the mentioned gap, and provided "compelling and logical justifications for altered views" (Whetten, 1989, p. 491) with respect to investigate phenomena of IS project escalation.

Additionally, the analysis revealed a relationship between customers' unclear ideas and IS project escalation. This finding contributes to current literature. Indeed, identifying relationships between particular variables, rather than simply listing them, is "the domain of theory" (Whetten, 1989, p. 492).

Furthermore, as discusses in chapter 9, the Project Escalation Framework presents great usability in various contexts of IS development projects outcomes. In this respect, project escalation, project failure, and project success can be regulated via the framework. Ultimately, the Project Escalation Framework represents multiple applications with respect to managing reasons building up to and resulting specific project outcome. On this, Whetten (1989, p. 493) has suggested:

> "a general rule of thumb is that critiques should focus on multiple elements of the theory. This approach adds the qualities of completeness and thoroughness to theoretical work".

This research also extended the existing literature by shedding further light to explain IS project escalation through employing Attribution Theory by examining both involved parties (i.e. principal and agent) in the IS development project. This would help to clarify the behaviour of these involved parties which occurred to justify their positions by blaming each other (i.e. Self-Serving Bias).

Additionally, the findings of this research add new valuable insights with respect to the studies of IS development, in terms of its contribution to knowledge transfer literature within that field. Thus, the empirical evidence identifies a number of relevant knowledge artefacts throughout the process of

RE, in addition to recognising their roles as various types of objects. Moreover in this respect, this research theoretically developed a novel framework to categorise the knowledge artefact as object based on the role they perform. Furthermore, investigating such objects helps to notify its development in terms of the form and function through different stages and knowledge boundaries, which spell out the object's nature and role which are affected by the practice. Besides, the concept of pluralist with respect to the object role aids to clarify the possible challenges during this collaboration activity (i.e. Knowledge transfer) in terms how each involved actor views and interacts with a specific object. In which, these viewpoints and interaction could be different from an actor to another actor, in terms whether this object is just a medium to pass the knowledge, or source of motivation, or the result of the assembled collaboration. Thus, learning such aspects seems important, in terms of providing a comprehensive understanding of the knowledge transfer process particularly in the field of managing an information system.

Whilst numerous past studies focus on IS development projects, very little is known about the best RE practices. Thus, this research took a step into this direction by emphasising the various roles of knowledge artefacts as objects within this practice, in terms of how to utilise these to the fullest as empirically verified. This is despite the existing critiques and the disadvantages of using project management tools as boundary objects (Sapsed and Salter,2004; Yakura,2002). Therefore, it seems that those studies focused on specific artefacts which are useful in managing the tasks and operating the project in general (i.e. Gant charts and Timelines) rather than those which assist knowledge flow in particular However, this research identified a number of knowledge artefacts and clarified their benefits through the RE process, thus providing a further perspective from which to study this topic.

Furthermore, analysing a number of IS development cases in a various contexts suggests the artefacts in the Knowledge Transfer Framework have much broader implications that go beyond acting as just a procedure to elicit customer requirements. The 'inclusion' or 'omission' of these artefacts contributes to project success or failure respectively. Consequently, this

understanding will result in improvement of IS development investigations, rather than exclusively enhance RE processes between principals and agents.

10.2.3 Contribution to Methodology

This research is one of only few studies that have employed a rigorous qualitative approach to address the challenges of project escalation and incomplete knowledge transfer in IS development projects in general. Moreover, this research is believed to be the first to qualitatively address these challenges in Saudi Arabia in particular. As clarified in detail in Chapter 4, this research has applied an inductive approach to meet the aims of the research and to answer the research questions. Such an application has provided an in-depth investigation and understanding of the phenomenon under consideration in terms of the perceptions and viewpoints of the participants. The general inductive flexible strategy used has permitted us to find a close contact with the participants who are directly involved, to an extent that has significantly allowed us to understand what it happening in the field. Moreover, the semi-structured interviews allowed us to undertake a detailed discussion and to introduce new insights not previously thought of. Additionally, interviewing two different groups (i.e. IS project managers and customers) has strengthened the findings through the application of data triangulation which has provided a rich and descriptive account of relevant events.

Furthermore, this research has employed a number of critical analysis techniques including thematic analysis, narrative analysis, content analysis, and data display analysis. It is also worth noting that the analysis has used a number of rigorous coding methods, namely open coding, axial coding, and theoretical coding. Additionally, this study has applied two more sophisticated analytic procedures (i.e. comparing and quantifying the qualitative data). Consequently, this variety of applied analytical methods has produced a deep level of comprehension, allowed the researcher to get below the surface and to explicate the complexities of the huge amount of collected raw data (i.e. the various opinions and perceptions of 40 participants in total).

Gaining access to the participants was arranged using convenience and snowball sampling techniques. At the same time, ethical considerations were taken into account in terms significantly maintaining the anonymity of all the participants. In addition, the data was kept confidential throughout all the stages of the research. Given that such a rigorous ethical protocol was applied, this led to an increase in the likelihood of gaining honest, accurate and thorough responses. Moreover, the field study associated with this research took place in Saudi Arabia, a country which is witnessing an important revival in the field of IS development, as the growing market associated with this field was valued at $8.6 billion US in 2013. As a result, this interest in studying IS project escalation markedly increased the importance of this research.

One more striking feature of this research is the employment of a number of computer software packages during the analysis, particularly the usage of 'Microsoft Office Access 2010' which is a database management system. This computer software was valuable in that the researcher was able to store a great deal of detail about the participants, their organizations, in addition to a huge amount of raw data. Moreover, this software allowed the researcher to efficiently manage to run a number of critical types of coding, to identify the relationship between different themes, and to produce a number of detailed analysis tables. Actually, the flexibility of this computer software in terms of running customized and specialised data queries allowed the researcher to effectively apply a number of analytical techniques, which it led to the production of more transparent, rigorous and accurate results.

10.2.4 Section Conclusion

According to the aforementioned detail, the findings of this research have a number of practical implications for IS development practice. In addition, they have a number of contributions to make to methodology, and to the available literature on IS project escalation and knowledge transfer within the same field.

The practical implications include raising critical awareness in terms of identifying the reasons behind IS project escalation, and behind the lack of clarity in terms of customers' ideas. Moreover, this research has pointed out a number of methods that can be used in response to a project escalation situation, with regard to which it seems crucial to be prepared for such a challenge from the beginning. In addition, this research provides useful guidelines in terms of how to significantly elicit customers' requirements. Another point is that the empirical evidence suggests that developers' perceptions with regard to IS project escalation are different, and depend on the organisational type (i.e. governmental or private). Thus, learning such aspects support IS project managers in making suggestions about how to appropriately respond to such a challenge according to each organisation's type. Regarding the parties involved in a project (i.e. the customer and the developers), evidence in this respect pointed out the expected role of these actors, and clarified that no one is totally to blame for the possible project challenges. At the same time, reviewing and refining requirement documents is crucial, because it represents a vital reference for all actors in the event of challenges they might face. Therefore, suggestions and recommendations derived from the research's findings, introduce valuable insights with regard to practice when it comes to managing a project, or dealing with its challenges.

This research contributed to various aspects of the current literature. One of these aspects is considering the identified gap in the IS project escalation literature by addressing the impact of the customer, given that this impact has been ignored by the majority of previous research. Furthermore, this research has supported and complemented a number of other sets of results found in the literature. In particular, this confirmation has been achieved by using a new perspective and setting, and by undertaking the empirical study in Saudi Arabia. Thus, this research should suit and accompany other studies in a wider range of contexts. Another point is that this research provides further clarification and altered views with respect to the phenomenon of IS project escalation using the Extend Agency Theory and Attribution Theory. In addition, the analysis reveals links between the links between the actors,

reasons behind unclear ideas, and reasons behind project escalation (i.e. relationship between variables). Moreover, the developed Project Escalation Framework exhibits multiple applications with respect to managing the reasons building up to, and resulting in, precise project outcomes (i.e. multiple elements of the theory).

Additionally, this research introduced further insights with respect to knowledge transfer in the IS development literature, in terms of identifying a number of relevant knowledge artefacts throughout the process of RE, in addition to distinguishing their roles as various types of objects. Learning such aspects has provided us with critical comprehension regarding the knowledge transfer process, particularly in the field of managing information systems. Furthermore, later analysis has revealed that such artefacts have implications that go beyond only being just a procedure to elicit requirements. The 'inclusion' or 'omission' of these artefacts, contributes to project success or failure respectively. Accordingly, such understanding leads to an improvement of IS development investigations in general, rather than enhancing RE processes in particular.

In terms of the methodology employed, this research is among the few that have used rigorous qualitative approach to address the challenges of project escalation and incomplete knowledge transfer in IS development projects generally. The adoption of an inductive approach, and the use of general inductive strategy enabled an extensive investigation, and provided an in-depth degree of understanding about the phenomenon under consideration. In addition, addressing the responses of two different groups using semi-structured interviews introduced a deeper comprehension and new insights. Furthermore, applying a number of critical analysis techniques to the complex set of raw data, provided rich and detailed findings and perceptions. In particular, this raw data is collected through using rigorous ethical protocols, which it led to a rise in the likelihood of obtaining accurate and thorough feedback. In addition, the use of database management software (i.e. Microsoft Office Access 2010), allowed the researcher to run a number of customized data queries in order to obtain critical types of coding, identifying the

relationship between different themes, and producing a number of detailed analytical tables. This has led to the production of more accurate results.

10.3 Limitations and Direction for Future Research

Despite the potential of the contributions identified by this research, there are number of limitations that need to be declared. Thus, they provide several research and investigative opportunities for future studies.

First, this research only took place in Saudi Arabia, and it was selected according to the large size of IS development investment. Similar studies could be applied in other countries around the world.

Second, from the beginning, this research had an exploratory nature. Additionally, its findings were generally inducted from the empirical evidence through the qualitative analysis. These findings need to examine their validity in order to generalise them. Hence, to achieve this, it is suggested to perform a deductive research, which employs a quantitative method (e.g. questioner), across the entire population of both the governmental and private sectors in Saudi Arabia.

Third, this research used convenience and snowball sampling techniques as it was useful alternative option to perform data collection. Such a technique was quite useful in terms of conducting a number of interviews and identifying various opinions and perceptions as declared by the interviewees themselves (i.e. the IS project managers and the customers). In this respect, it could be argued that using the interviewing method seems effective to capture many of the elements and to clarify specific points which made up the larger context of data, although, such a method is dependent on the interviewee being honest in terms of providing correct and elaborate replies. This means there is a risk that the interviewee’s answers are not that accurate due to a feeling of nervousness or responsible, or due to unconsciously forgetting.

Actually as these interviews were conducted individually, this might have given the interviewees a chance to present self-serving bias attitudes, in

that there is no one to argue with their statements regardless the accuracy of such statements. On this ground, Myers and Newman (2007, p. 2) criticised the "very artificial situation" of interviewing sessions. This is because during interview, the interviewee responds to a stranger's questions by answering or maybe creating an answer under time pressure. Thus, recommendations for future research include perhaps carrying out a longitudinal study which considers using observational methods, so the researcher can track behaviour and witness the interaction between the different actors as they occur throughout the different project stages. Such future study may strengthen the robustness of IS project research with respect to the findings of this research.

Fourth, this research took the consideration of IS project managers and customers in terms of their perceptions and opinions. The findings presented other involved actors, like IS development higher management, people from the security and quality assurance departments, and out-sourcing parties. Thus, this research might be extended to count the response of these other actors in terms of considering their feedback and responses in respect to the challenges of IS project escalation and unclear ideas. Additionally, this should give a chance to defend their position in respect to what has been mentioned against them, as a result, this should provide a balanced awareness, and enrich the understanding in respect to research interest.

Fifth, as a result of adopting and employing the suggested theoretical framework this research started with, which was inspired by the viewpoint of the extended agency theory, the findings mainly contribute to two fields, namely project escalation and knowledge transfer within the practice of IS development. Thus, it is suggested for future research to consider these findings, and then extend the investigation of each field separately. This seems to provide a more concentrated insight and focused understanding with respect to each field.

10.4 Research Conclusions

When considering the limitation in the current empirical studies that ignored the impact of the customer (agent) in terms of the incompetency to transfer the knowledge to the developers (principal) which led to project escalation, this research has significantly added to the current literature of IS development. Moreover, the identified findings of this research have contributed to both theory and practice in that industry. Most of the developed hypotheses and introduced relationships have been empirically conducted using qualitative analysis.

Overall, from the theoretical perspective, it is significant to consider the impact of the customer on IS development projects, particularly when it comes to knowledge transfer, as any challenge could be a potential reason for project escalation. Moreover, learning about successful method and identifying the right role for the used tool and artefacts would help to clarify the development and the form that knowledge takes during the transfer process. Consequently, this can improve the knowledge transfer process outcome by providing the right response each actor can make at different stages throughout the process.

From the practical perspective, this research provides a number of serious awareness and useful suggestions which reflect the perceptions held by a number of IS project managers and customers from real life applications. Thus, by considering learning from such rich experience in terms of employing the pointed advantages, and avoiding the figured drawbacks would positively reflect on the practice. This includes managing and dealing with challenges of IS development projects and RE process.

Finally, it is arguable that the research's findings meaningfully contribute to the theoretical understanding and how they directly impact on practical values. The author hopes this research affords a reasonable foundation and inspires further fruitful studies to investigate deeper into this interesting and growing research topic.

10.5 Conclusion

This chapter has discussed the contributions that this research's findings provide. Moreover, a number of practical and theoretical implications have been discussed in terms of the contribution to the field of IS development studies and practice. Some limitations and recommendations for future work were then presented. Later, this chapter ended with the research conclusion.

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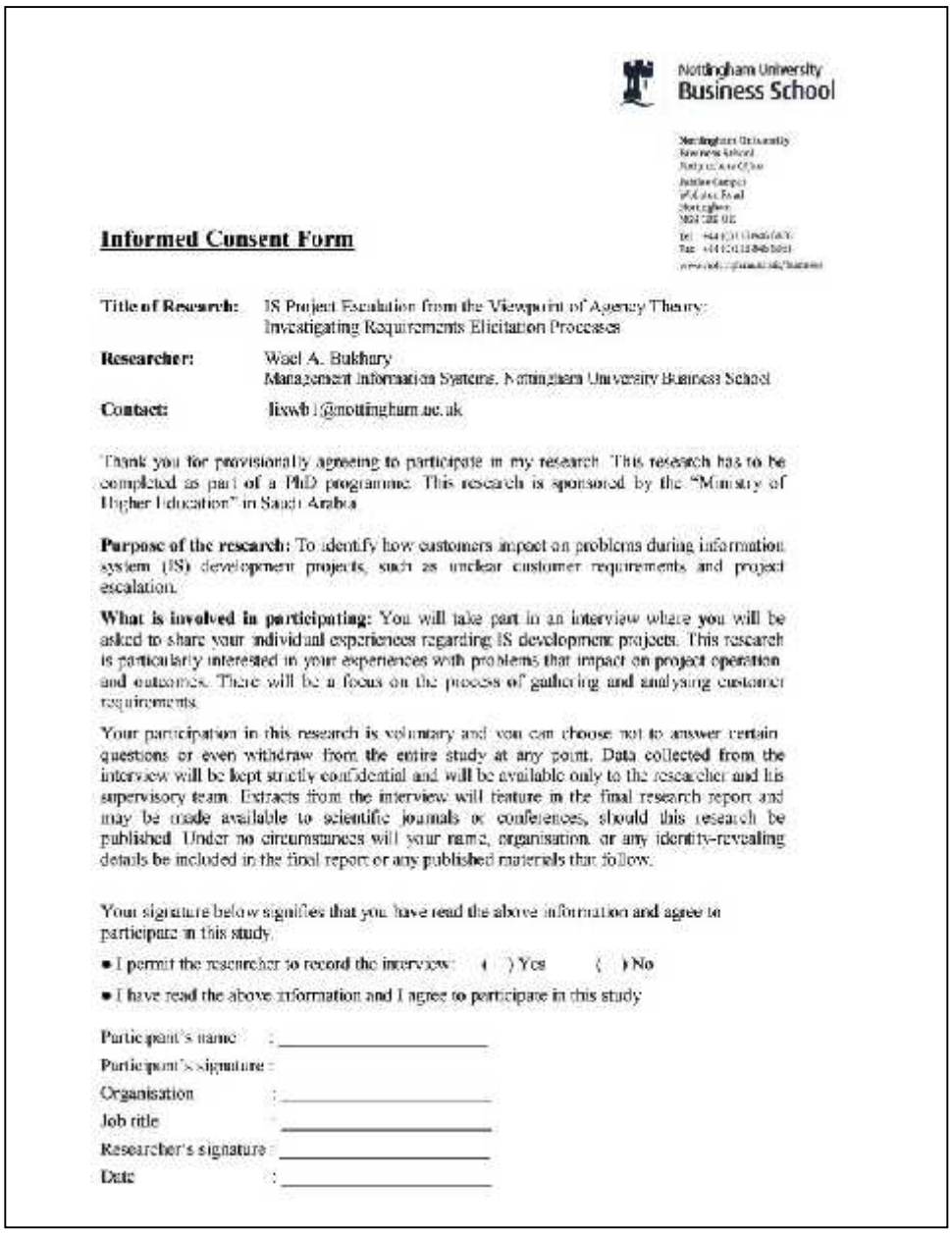
Appendices

Appendix I: Informed Consent Form



Nottingham University Business School

Informed Consent Form

Title of Research:	IS Project Escalation from the Viewpoint of Agency Theory: Investigating Requirements Elicitation Processes
Researcher:	Wael A. Bukhary Management Information Systems, Nottingham University Business School
Contact:	lixwb1@nottingham.ac.uk

Thank you for provisionally agreeing to participate in my research. This research has to be completed as part of a PhD programme. This research is sponsored by the "Ministry of Higher Education" in Saudi Arabia.

Purpose of the research: To identify how customers impact on problems during information system (IS) development projects, such as unclear customer requirements and project escalation.

What is involved in participating: You will take part in an interview where you will be asked to share your individual experiences regarding IS development projects. This research is particularly interested in your experiences with problems that impact on project operation and outcomes. There will be a focus on the process of gathering and analysing customer requirements.

Your participation in this research is voluntary and you can choose not to answer certain questions or even withdraw from the entire study at any point. Data collected from the interview will be kept strictly confidential and will be available only to the researcher and his supervisory team. Extracts from the interview will feature in the final research report and may be made available to scientific journals or conferences, should this research be published. Under no circumstances will your name, organisation, or any identity-revealing details be included in the final report or any published materials that follow.

Your signature below signifies that you have read the above information and agree to participate in this study.

- I permit the researcher to record the interview: ( ) Yes ( ) No
- I have read the above information and I agree to participate in this study.

Participant's name : _____

Participant's signature : _____

Organisation : _____

Job title : _____

Researcher's signature : _____

Date : _____